

THE ADOPTION OF CLOUD COMPUTING FOR SMALL
AND MEDIUM ACCOUNTING FIRMS

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Abstract

Cloud computing is a contemporary information technology (IT) concept that has attracted overwhelming attention from the academics and practitioners of the IT industry. By connecting a large number of servers around the world via the internet and pooling the resources that they generate, cloud computing is a promising innovation that is expected to deliver significant cost savings and unprecedented flexibility on how businesses consume IT resources. The accounting industry, in particular, perceives cloud computing as a potent threat to itself. However, prior studies that examine cloud computing from the business perspective are limited. Moreover, despite the rapid growth of cloud computing in the accounting industry, there is no prior study that focused on the accounting industry.

The purpose of this study is to explore the factors that led to the rapid growth of cloud computing specifically in the accounting industry, and to explore the roles that cloud computing played within the accounting firms. The accounting industry is chosen due to the high popularity of cloud computing within it, and the homogeneous nature of the accountancy services. This study uses a multiple case study design, and semi-structured interviews are carried out with the decision makers of six accounting firms.

The results revealed that the concept of cloud computing refers to many types of applications. For accounting firms, cloud computing consisted of an external (client-oriented) role and an internal (practice management) role. The rapid development of cloud computing occurs primarily in the external role, where cloud computing is used as a competitive tool. On the other hand, the usefulness of cloud-based practice management systems is limited to the micro accounting firms only.

This study makes an important contribution in the field of cloud computing research. It should be recognised that the role of cloud computing extends beyond its technological merits, and varies depending on the characteristics of the industry and the strategy of the business. It is recommended that future studies take into account the ways firms incorporate cloud-enabled technology into the firm's business process and strategy.

Chapter 1. Introduction

Cloud computing had attracted considerable attention from the information technology (IT) industry since the term was coined in 2008. Described as a paradigm-shifting innovation, cloud computing brings together different pieces of technology and computing resources to create a coherent ecosystem over the internet. This resulted in significant improvements to the ability for IT service providers to aggregate and coordinate resources for computing-intensive tasks. For businesses that use cloud computing, cloud computing reduces the cost of purchasing and maintaining IT infrastructure, as well as providing better flexibility in terms of how computing resources can be bought and consumed.

However, due to the contemporary nature of cloud computing technology, the demand side of cloud computing is yet to mature. Cloud computing is a vague concept that takes various forms in practice, and there are multiple definitions that attempt to describe different characteristics and forms of cloud computing (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011). The theoretical benefits that cloud computing provide are yet to be fully realised by IT professionals, as many of the existing cloud products either do not fully utilise these benefits, or simply marketing hype (Hoberg, Wollersheim, & Krcmar, 2012). The concept also induces concerns and uncertainties regarding the safety, privacy and reliability of cloud computing.

In spite of the theoretical benefits, confusion and concerns of cloud computing, the accounting industry is one area that cloud computing is flourishing. Cloud-based accounting software like Xero had experienced exponential growth in terms of popularity, market share and share price since 2008 (Xero, 2014). Cloud-based accounting applications have been perceived by the accounting industry as potent threats against conventional accounting practices, even though their features are not as comprehensive as the desktop counterparts. Cloud service providers like WorkflowMax (2013) and CCH (2013) posited that the popularisation of cloud computing could drastically alter the state of the accounting industry, but their interest in the cloud computing market reduces the credibility of their claims.

The motivation of this study primarily stems from the rate of adoption of cloud computing within the accounting industry, which appears to have far outpaced the others. Existing

cloud computing adoption studies also do not provide an adequate explanation. The majority of existing cloud computing literature tends to focus on the technical, supply-side issues of cloud computing (*what is the most efficient way to generate and distribute computing resources that meet the users' needs?*), rather than the demand-side (*why do people and businesses use cloud computing?*). The demand-side studies of cloud computing also vary considerably in terms of the contextual factors. These factors, such as country and industry, generally have a strong influence on how businesses conduct their operations and achieve their goals. Moreover, the adoption studies do not explicitly link the adoption behaviour with the business' operating environments, strategies or processes.

This is an exploratory study that intends to investigate the demand-side aspects of cloud computing in the context of the accounting industry. A multiple case study design is used. The unit of analysis is accounting firms (firm-level), with an emphasis placed on small accounting firms. Data is gathered by conducting semi-structured interviews with the decision makers from six different accounting firms. The study focuses on the decision makers' perception towards the new cloud phenomenon, and the factors that led to their decision to adopt (or reject) cloud computing.

The accountants' usage of cloud-based technology is divided into two categories: adopting cloud computing in order to improve the service to their clients (as an interorganisational system), and using cloud-based practice management systems for their own use. This is an important distinction, as prior studies of cloud computing have not clearly defined the scope of cloud computing in terms of the purpose of the systems.

This thesis is structured as follows. Chapters 2 to 4 review the existing literature on the meaning and the significance of cloud computing to the business community, followed by a review of previous cloud computing adoption studies. Chapter 5 identifies the gaps in the literature, and specifies the research questions and scope of this study. Chapter 6 discusses and justifies the methods that are chosen to undertake the study. Chapters 7 and 8 present the findings from the research and analyse the results to identify patterns. Chapter 9 attempts to explain the observations by establishing connections between the results and the relevant theories. Finally, Chapter 10 concludes the study by discussing the contributions, potential implications and limitations of this study.

Chapter 2. Literature Review: Cloud Computing

Cloud computing is widely regarded as a paradigm-shifting innovation that can significantly alter the way IT resources are provided, used and paid for businesses (Armbrust et al., 2010). Unlike other IT innovations, cloud computing combines pre-existing heterogeneous technologies into a coherent ecosystem, rather than establishing a new set of systems entirely (Avram, 2014). Unfortunately, this makes the definition and the scope of cloud computing particularly difficult to ascertain.

The literature review is separated into three chapters. This chapter examines the definition of cloud computing, the arguments that favour and reject the feasibility of cloud computing, and the claims of cloud computing's impact on the accounting industry. Chapter 3 discusses the firm-level information system (IS) adoption models, while Chapter 4 reviews the empirical studies on cloud computing adoption.

2.1 Definition of Cloud Computing

The most widely accepted definition of cloud computing is proposed by National Institute of Science and Technology (NIST). This definition is commonly used as a foundation, where later studies derive their interpretations of cloud computing based on these factors (Hoberg et al., 2012). According to NIST, cloud computing is defined as "... a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources... that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance, 2011). This definition outlined five characteristics that are essential to a cloud computing model:

- on-demand self-service (computing resources are allocated automatically based on load),
- broad network access (resource is accessible via the internet, irrespective of client's platform),
- resource pooling (all computing resources are generated and pooled together before allocating them to users),

- rapid elasticity (ability to increase or shrink computing resources to meet fluctuations in users' resource pattern), and
- measured service (users' resource use can be monitored and controlled).

Software as a Service (SaaS) is the most common and most mature form of cloud computing. Under SaaS, the hardware and software are provided by the cloud service provider, and users are granted access to the software (Gupta, Seetharaman, & Raj, 2013; Sultan, 2011). Typically, the SaaS model relieves users from the expertise and efforts required to maintain their own software, but allows very limited scope for users to customise the system (Mell & Grance, 2011).

SaaS is not the only form of cloud computing, however. It is commonly established that cloud computing is available in three forms: SaaS, Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) (Mell & Grance, 2011). In contrast to SaaS, IaaS provides only data storage and computing resource hardware infrastructure, and users have to deploy their own operating systems and software (Mell & Grance, 2011). IaaS eliminates the need to maintain hardware while allowing for a high degree of flexibility and customisation by the user, but does not typically relieve the user from having to maintain their own software. For this reason, IaaS is most favoured by large institutions such as large corporations (PwC, 2011) and universities (Sarkar & Young, 2011). PaaS offers a middle ground, where the cloud service provider maintains a platform of systems and toolkits, and users may deploy their own applications that are compatible (Mell & Grance, 2011). The boundary between IaaS and PaaS is not well-defined, as neither of them provides an out-of-the-box solution like SaaS (Armbrust et al., 2010). However, there are subtle differences in their intended markets: PaaS focuses more on supporting businesses to develop their own applications, rather than providing the hardware (Weinhardt, Anandasivam, Blau, & Stöber, 2009).

Effectively, the core principle of cloud computing is the centralising of computer resources (in terms of hardware and applications) and providing them to many users as a service (Stanoievska-Slabeva & Wozniak, 2010). Cloud computing does not refer to a tangible product or piece of technology, but a particular arrangement of computing resources. As

the previous definition suggests, cloud computing can refer to any IT infrastructure that separates the user of computing resource from the providers of said resources.

However, the concepts incipient in cloud computing is not unique, or new. Critics questioned the appropriateness of labelling cloud computing as a new paradigm, because of its resemblance to existent concepts such as grid computing and application service providers (ASP) (Weinhardt et al., 2009). The similarity caused significant confusion over the substance of cloud computing and its improvements over the predecessors (Armbrust et al., 2010). Evidently, earlier articles and definitions had implicitly equated Software as a Service to cloud computing, even though SaaS was only a part of the latter (Payton, 2010; Stanoevska-Slabeva & Wozniak, 2010). This also created labelling issues, as IT providers misused “cloud computing” for marketing purposes (Hoberg et al., 2012). For example, web-based email services (such as Hotmail) satisfy the definition of cloud computing, yet it existed well before the term cloud computing was invented (Du & Cong, 2010).

Cloud computing does distinguish itself from grid computing, in that it utilises virtualisation much more heavily than grid computing. This allows the computing resources to be accessed from the internet rather than a specialised interface, and makes it possible to enforce service-level agreements between the cloud provider and customers (Stanoevska-Slabeva & Wozniak, 2010; Weinhardt et al., 2009). However, a detailed discussion regarding the technical differences between grid and cloud computing is outside the scope of this study.

2.2 The Business Case for Cloud Computing

Cloud computing is described as a new paradigm in the form of “... convergence between... IT efficiency... and business agility” (Marston et al., 2011, p. 177). Effectively, the concept of cloud computing allows businesses to use IT services more flexibly than conventional in-house solutions, and often at a much lower cost.

Cloud computing permits greater flexibility in how computing resources are used by businesses. Because cloud computing connects a wide range of computing devices via the internet, cloud computing creates an illusion of infinite resources (Armbrust et al., 2010).

Resources under the cloud computing model are pooled and can be provided to any user at any given time, which means that cloud service providers can supply a virtually unlimited amount of computing resources to their users at a very short notice, as well as reallocating computing resources that a user no longer needs to other users (referred to as rapid downscaling).

In practice, this allows business users to make last-minute adjustments to their IT services to match their actual demand. This relieves businesses from having to forecast resource usage into the future, or carry additional capacity that are not needed during the majority of the year (and paying for those unused capacity) (Armbrust et al., 2010; Marston et al., 2011). This is particularly beneficial for businesses whose resource usage pattern fluctuates significantly, or the demand for computing resources consists of irregular peaks and troughs (Marston et al., 2011). Additionally, cloud computing provides the ability to spread computation-intensive tasks over a large amount of servers around the world. For projects that were previously deemed to be too resource-consuming using traditional IT infrastructure, cloud computing can tap into a much larger pool of computing resources to complete the computing-intensive tasks more quickly (Grossman, 2009).

Cloud computing also reduces the risk of investing in IT infrastructure by substituting capital investment with operating expenses. IT infrastructure is a highly risky investment, because while IT systems are often believed to produce significant benefits and even competitive advantages, there is no guarantee that such benefits would necessarily accrue to the firm (Clemons, 1986; King, Grover, & Hufnagel, 1989). In fact, the relationship between implementing new IT systems and the firm's competitive advantage is anecdotal at best, and questionable at worst (Zhang & Lado, 2001). In more recent years, the Global Financial Crisis had severely cut back businesses' capital investments and discouraged risk-taking behaviour (Grubisic, 2014).

The fact that cloud computing requires practically no up-front IT investment was perceived as a very desirable trait. Since cloud-based services are charged based on usage or subscription, businesses are able to acquire new IT systems without incurring significant costs in acquiring the necessary IT hardware, software licenses or the ongoing maintenance cost (Du & Cong, 2010; Grubisic, 2014). This feature is particularly appealing to smaller

businesses, as they generally lack the financial capital and expertise necessary to acquire, implement or manage sophisticated IT systems (Iacovou, Benbasat, & Dexter, 1995). The elimination of up-front investment by cloud computing means that small businesses are also able to adopt cutting-edge IT systems, derive benefits from them, and make them better equipped in terms of information systems to compete with their larger counterparts (Marston et al., 2011).

Finally, by centralising computing resources, cloud computing offers greater efficiency and less maintenance on the user's part. In-house IT solutions are usually highly inefficient, as most corporate servers have an average utilisation rate of approximately 30% (Marston et al., 2011). By combining and consolidating computing resources, cloud service providers can take advantage of economies of scale and realise cost savings up to a factor of seven (Armbrust et al., 2010). This cost savings may be passed onto the users, which ultimately lowers their total IT cost. Moreover, since applications and infrastructure over the cloud reside with the cloud service provider, this eliminates the need on the user's end to incur additional expenditure or time to manage the IT systems.

2.2.1 Risks and Uncertainties

Despite the apparent benefits of cloud computing, the characteristics of cloud computing embody inherent risks and uncertainties for its users. As cloud computing is provided by a third party over the internet, data is stored in remote servers, rather than onsite. As a result, cloud computing requires businesses to relinquish their physical control over their data, and may give rise to anxieties regarding the security, reliability and privacy of the users' data (Armbrust et al., 2010).

The security of cloud-based storage is a concern particularly for CPA firms (chartered accountants), due to the fact that accountants handle sensitive and confidential information (Du & Cong, 2010). The anxiety over security primarily stems from the fact that business users that adopt cloud do not have physical control over their data. The data may be lost or exposed to unauthorised parties, and users must rely on the service providers to implement proper controls and security measures. However, there has been an expanding pool of literature that refutes this concern. Molnar and Schechter (2010) suggested that the user's

data are in fact safer in the cloud, as cloud providers have better economies of scale to implement proper access controls. In comparison, businesses that host their IT infrastructure in-house may not be able to implement the equivalent level of security measure, due to the lack of resources. Moreover, more recent empirical studies suggest that smaller firms perceive data security less importantly than their larger counterparts, and small businesses are in a better position to negotiate a trade-off between the benefits of cloud computing and perceived data security (Gupta et al., 2013; Sobragi, Maçada, & Oliveira, 2014; Sultan, 2011).

Privacy is another major concern for users of cloud computing. While security and privacy are often mentioned together, the security measures discussed above do not generally resolve privacy concerns (Armbrust et al., 2010). Since users' data reside with cloud providers, this gives rise to the perception and suspicion that cloud providers may abuse their privileged access to the users' data for their own commercial benefit without the knowledge or consent of the user (Du & Cong, 2010; Gupta et al., 2013; Kingsford, 2014). For smaller businesses seeking to adopt cloud-based ERP systems, data privacy represents one of the most significant obstacles to its popularity and reception (Grubisic, 2014). Unlike data security, the solutions to the privacy concerns lie in social tools (contracts and enforceable agreements) rather than technical measures (Armbrust et al., 2010).

Finally, the detachment of physical control gives rise to the issue of reliability, where businesses fear losing access to their business process and data. One reliability concern is the availability of cloud-based service, where businesses are concerned that cloud services may become unavailable at any given time, resulting in lost revenue and hindrance to business efficacy (Sultan, 2011). While reliability is a problem in all IT systems, the user's ability to insulate or mitigate against data loss and withdrawal of vendor services is severely more limited when the IT systems are hosted in the cloud (Du & Cong, 2010).

2.2.2 Attitude towards Cloud Computing

The interest and strengths of cloud computing did not necessarily translate into intention, however. As the two studies below show, IT professionals were sceptical towards whether cloud computing is viable enough to replace the traditional IT model.

Author	Data Source	Factors
(Lin & Chen, 2012)	IT Professionals, Taiwan	Customer needs, compatibility, relative advantage, maintenance.
(PwC, 2011)	Senior and middle managers of large businesses; and IT outsourcers.	Security, relative advantage, workload readiness.

Table 2-1: empirical studies regarding the attitude towards cloud computing

Lin and Chen (2012) investigated the understanding and concerns of cloud computing by IT professionals. An IT professional was defined as someone with at least three years of working experience in IT companies or the IT department of large companies. The respondents identified customer needs as a major determinant for their cloud adoption decision, as the businesses are reluctant to adopt cloud-based solutions without explicit request from their customers. The compatibility of cloud-based software with the company's existing information systems and policies is another concern that impedes the respondents' enthusiasm towards cloud computing. Cloud-based systems are considered to be beneficial for individual staff members and informal teams, but adopting cloud computing for the organisation as a whole lacks apparent benefit in doing so. The interest towards cloud computing was further dampened by the potential risks such as loss of control over information systems, hidden costs and the need to retrain staff members.

A similar theme is echoed in PwC (2011) study. Surveying 489 senior and middle managers in large companies (ninety percent of which exceeds \$500 million in revenue) and 261 IT outsourcing providers, there was a noticeable gap between the perception of cloud computing and the plans that were in place to ensure adoption. Despite the respondents' apparent optimism towards the trend of cloud computing, most of them estimated that an

additional workload of only 3% would be migrated into the cloud in the next three years. The concern for security, especially the loss of control over data, was perceived as a major issue by 62% of respondents. The large corporations also faced substantial switching costs, due to the fact that their existing database management systems and certain applications were originally written for the traditional IT service model, and significant modifications were necessary to take advantage of the cloud-based architecture.

In short, the studies indicate a strong reluctance by IT professionals to adopt cloud computing. This suggests that the benefits of cloud computing are mostly theoretical and unexplored. Since there was little time for cloud computing to evolve and mature, this result is hardly surprising. However, the accounting industry is a notable exception.

2.3 Cloud Computing and Accounting

Historically, accounting systems were the primary driving force behind the demands for IT systems (Cragg & King, 1993). In recent years, the rise of new, cloud-based accounting software had led to sombre forecasts in the accounting sector. It is little surprise, perhaps, that accounting firms have become particularly interested in the adoption of cloud computing, and an increasing number of accountants began to provide cloud-based accounting solutions to their clients. Yet, despite the rate of development, academic studies that explicitly examined the impact of cloud computing on accounting industry was virtually non-existent.

A research report conducted by CCH (2013) had indicated an overwhelming interest in cloud-based accounting. The report surveyed 1018 owners of small to medium enterprises (SMEs) and 212 accountants across Australia for their perceptions towards cloud computing. According to the report, 65% of the SMEs and 60% of the accountants indicated that they would consider adopting cloud computing. The interest is much stronger among younger accountants and business owners (35 years of age and younger).

Moreover, the report concluded that cloud accounting may prove to be a threat for accountants' future survival. The study showed that 53% of SME owners indicated that they would replace their accountants if they fail to adopt cloud computing. This is particularly

disturbing news to accountants, given that 63% of accountants' work consists of transactional services. Transactional services include financial reporting, tax returns and simple financial analysis, which can be easily automated by cloud-based software due to the highly structured and low skill level requirement nature of the work. In other words, accountants risk having their "cash cow" businesses cut out by cloud computing via the loss of business or reduction in revenue potential due to automation.

This concern is echoed by other providers of cloud accounting solutions, albeit less sombre. WorkflowMax (2013), for example, suggests that cloud computing would transform accountants' jobs by automating the "mundane, number-crunching tasks", and supporting accountants' roles as business advisors. Nonetheless, if the argument of CCH (2013) is accepted that number-crunching comprises over half of accountants' job, cloud computing is expected to significantly change the form and ways accounting is practiced.

Although it is imprudent to discount their statements entirely, it should be noted that the neutrality of the viewpoints above are questionable. Since both CCH and WorkflowMax are cloud service providers in the accounting industry, this gives them a vested interest in the future of cloud-based accounting solutions. Their viewpoints may contain marketing hype. It is also difficult to ascertain the extent to which their findings and commentaries are tainted with their own vested interests and biases.

2.4 Summary

In summary, cloud computing is recognised as an important innovation that can potentially transform how businesses use IT to conduct their operations. Meanwhile, there is a considerable disconnection between enthusiasm and action, as IT professionals do not perceive the cloud products to be stable and mature enough for adoption. The same cannot be said for the accounting industry, which appears to be experiencing significant changes in light of the new cloud computing technology.

Chapter 3. Literature Review on IS Adoption

This chapter examines the relevant theories pertaining to IS adoption. The adoption of information technology systems is the process of “... using computer hardware and software applications to support operations, management, and decision making in the business.” (Thong, 1999, p. 192). Adoption specifically prescribes that the IS is used productively, which implies that the IS must be generating some form of benefit (Oliveira & Martins, 2011; Thong, 1999). An IS adoption theory provides a framework, based on which the factors that affect the adoption of an information system are categorised.

The vast majority of studies on IS adoption utilise one of the following models: Diffusion of Innovations (DOI) theory, and Technological, Organisational and Environment (TOE) Framework. These models are combined and refined by subsequent studies. This section provides an overview of these models. Alternative theories, such as Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) are not examined, as they relate to individual-level adoption. Hence, they are outside the scope of this study.

3.1 Diffusion of Innovations theory

DOI at the firm level proposes that organisational innovativeness is related to three factors: leader characteristics, organisational structure and organisational characteristics (Rogers (1995), as cited in Oliveira & Martins, 2011). The factors are shown in the table below.

In the “internal characteristics of organisational structure” category of the model, centralisation refers to the extent of which decision making authority within a firm rests with the minority. Complexity refers to the knowledge and expertise the members in that business possess. Formalisation refers to how rigidly rules within the organisation are followed. Interconnecteness measures the extent of social networks the organisation has. Organisational slack refers to the available resources (financial or otherwise) the organisation can call upon. Finally, firm size is measured by the number of employees (Oliveira & Martins, 2011).

While DOI provides a comprehensive set of factors to evaluate the technical merits of an IS innovation, the omission of the external environment aspect is a major drawback (Oliveira & Martins, 2011; Oliveira, Thomas, & Espadanal, 2014; Yazn, Savvas, & Feng, 2013). For this reason, DOI is more commonly used as a complementary perspective, rather than as a standalone model.

Category	Sub-category
Leader characteristics	Attitude towards change
Internal characteristics of organisational structure	Centralisation
	Complexity
	Formalisation
	Interconnectedness
	Organisational slack
	Size
External characteristics	System openness

Table 3-1: Diffusion of Innovation (DOI) theory

3.2 Technological, Organisational and Environmental (TOE) Framework

The TOE model describes the process of innovation by an enterprise in terms of three factors: technology, organisation and external task environment (Tornatzky and Fleischer (1990), as cited in Oliveira & Martins, 2011). The factors identified are listed as below:

Technological, Organisational and Environmental framework	
Technology	Availability Characteristics
Organisation	Formal and informal linking structures Communication process Size Slack
External task environment	Industry characteristics, market structure Technology support infrastructure Government regulation

Table 3-2: Technological, Organisational and Environmental (TOE) Framework

Compared to the DOI theory, TOE focuses more on the surrounding environment, rather than the innovation itself or the organisation. The TOE Framework is not exclusive to any specific information systems, which makes it a versatile framework suited to a wide range of IT innovations (Oliveira & Martins, 2011).

3.3 Iacovou's EDI adoption model

Iacovou's model was developed by Iacovou et al. (1995), and was originally used to study the factors for small businesses to adopt Electronic Data Interchange (EDI) systems. EDI is a standard that facilitated direct communication interface between firms within the supply chain. Adopting EDI systems eliminated the need for businesses to process documents such as purchase orders and invoices manually, as well as improvements to the businesses' response time and operating efficiency ("*What is EDI?*"). One of the unusual features of EDI is that an EDI system is most effective when, and only when, all of a firm's trading partners are adopting the same system. This creates additional factors when considering EDI adoption.

The authors proposed an alternative version of the adoption model, as shown in Figure 1.

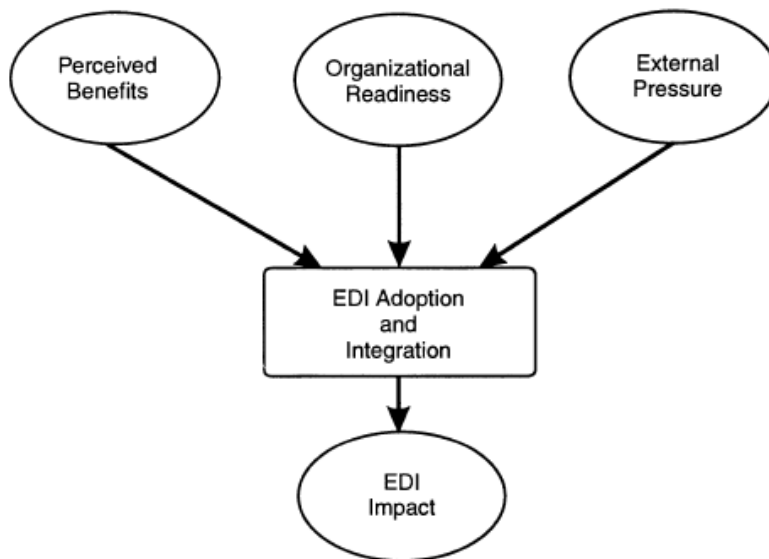


Figure 1: EDI Adoption model, from Iacovou et al (1995)

As shown in Figure 1, the authors established EDI Integration as a separate concept to EDI Adoption. According to the authors, EDI adoption referred to the business' capability to transact via EDI, and integration referred to the extent to which EDI is embedded within the business practices. This is to recognise that some firms operated EDI-capable equipments in isolation to the rest of the business. EDI integration can be further divided into internal integration (interconnection between various business applications) and external integration (linkage between itself and external trading partners).

The perceived benefits factor emphasised the importance of competitive advantage in an environment where IS affected more than one firm. The benefits may cover all of cost, competitive advantage and perception aspects of outsourcing decisions. Iacovou et al (1995) found that benefits of EDI adoption accrued in two forms: direct benefits and indirect benefits. Direct benefits refer to cost reduction and efficiency improvements, while indirect benefits include improved business relationships and customer service quality. It was found that, by achieving higher level of EDI integration, the firm derived greater indirect benefits in terms of competitive advantage.

Organisational readiness refers to the financial and technological resources that are available to the business. Financial resources are necessary for the installation cost and

operating expenses of EDI systems. In addition, the efficacy of EDI systems depends on the extent of integration into existing business practices, which can be costly. Technological resources refer to the level of sophistication of IT usage within the firm, as firms that are more familiar with IT systems can adopt new IT systems more quickly and comfortably than those that don't. This view can be expanded using other factors identified in relevant IS adoption literature, such as firm size and management attitude (discussed in section 4.2: Organisational).

An important contribution of the study is the identification of trading partners as a source of pressure. Because EDI relied on networking between firms, the effectiveness of EDI was optimised only when all of a firm's trading partners adopted the same technology. This provided the incentive for businesses to urge its customers and suppliers to adopt EDI, and small firms were particularly vulnerable to such pressure due to their (lack of) relative power and position.

While the Iacovou model appears to be similar to the TOE framework, the former incorporates concepts and factors that were specific to EDI, such as the notion of competitive advantage and pressure from trading partners.

3.3.1 An Application in New Zealand context: Mehrtens et al (2001)

The study conducted by Mehrtens, Cragg, and Mills (2001) studied the factors that prompted small firms to adopt internet-related technology. Using the same adoption model and research method as Iacovou et al. (1995), this study provided support that the Iacovou model can be generalised into other forms of IS adoption studies. This study is more closely aligned with the current study, due to the fact that it was conducted in the New Zealand context, and that the technology examined bears similarities with cloud computing.

Compared to EDI, the features of internet better resembled cloud computing. The study defined internet as business website and email account, for which the acquisition and ongoing maintenance cost was minimal compared to EDI. This resembled the low upfront investment and low maintenance features of cloud computing. Moreover, the internet was less industry-specific compared to EDI: EDI is more common in manufacturing sectors

characterised by long and complex supply chains. The internet-based technology is used primarily in information sectors.

The study undertaken by Mehrtens et al. (2001) also utilised a multiple case study research design, and inherited the three categories from Iacovou's model: perceived benefits, organisational readiness and external pressure. The final model of the study is shown in Table 3-3, with the factors that were additional to the Iacovou's model shown in bold.

In terms of perceived benefits, three factors were observed. The internet had a relative advantage over traditional methods of communication like telephone and faxes, in that the internet expanded businesses' source of information to a global scale and allowed better communication. The website provided a better channel of advertising and customer service. In addition, adoption of the internet also sought to reinforce the business' image and promotion.

Findings pertaining to organisational readiness revealed that the knowledge of non-professionals played a more significant role than professionals. This is primarily due to the businesses' lack of access to experts: commonly, adoption of internet is championed by owners, who do not necessarily have professional expertise in technology. Sophistication of the business' IT system was another relevant factor. However, a major departure from the Iacovou model is that financial resources and firm size were found to be irrelevant. One likely explanation for the financial resource is that the adoption of internet did not result in significant resource expenditure, for which the same can be said about cloud computing.

While external pressure was also an important factor, the source of pressure differed considerably from Iacovou et al. (1995). In the case of internet adoption, the most prominent source of external pressure was from customers, as opposed to trading partners. This is due to the fact that businesses that had a website and email account were perceived to be more credible compared to those that didn't. As a result, businesses were faced with the expectation from their customers, which motivated them to adopt the internet.

Mehrtens et al	
Perceived benefits	Relative advantage in terms of efficiency and cost. Source of information. Business tool (firm image and promotion).
Organisational readiness	Internet knowledge among non-professionals. Adequate computer systems.
External Pressure	Pressure from customers. Pressure from other groups (suppliers, prospective employees)

Table 3-3: model used in Mehrtens et al. (2001) Bold indicates additions from Iacovou et al (1995) model

Chapter 4. Literature Review: Empirical Studies of Cloud Computing Adoption

This chapter reviews the empirical studies of cloud computing to examine their methods used and their key findings. A summary table of studies reviewed is shown in Table 4-1. Due to the differences in geographical locations, time, sample characteristics and the scope of cloud computing of the studies, care should be taken when comparing the findings directly. Nonetheless, these studies provided empirical evidence towards the factors that encouraged cloud computing adoption.

Authors	Model used	Sample and Method	Prominent findings
(Benlian & Hess, 2011)	Opportunity and risk framework (Theory of Reasoned Action)	349 responses out of 2,000 German companies. Survey method.	Cost advantage, strategic flexibility and quality improvements are the most salient perceived opportunity; while security risks is the most salient risk belief.
(Benlian, Hess, & Buxmann, 2009)		374 responses from 297 German companies (from random sample of 5,000). Survey method.	SaaS with low specificity, strategic significance and uncertainty are most likely to be adopted. Office and collaboration most adopted; ERP least adopted.
(Gupta et al., 2013)	n/a (benefits and risk factors only)	211 small and micro firms in APAC region. Survey method.	Ease of use and convenience most important; cost not most important factor; security and privacy of cloud deemed acceptable.

(Low, Chen, & Wu, 2011)	TOE	111 high-tech firms from Taiwan (out of top 500 firms). Survey method.	Environmental factor significant; relative advantage significantly negative.
(Oliveira et al., 2014)	TOE + DOI	369 firms in Portugal in manufacturing and service sectors. Survey method.	Combined DOI and TOE models; technology readiness; environmental not significant.
(Yazn et al., 2013)	TOE	15 SMEs in north east England. Multiple case study method.	Geo-restriction was important factor; top management crucial to adoption success.

Table 4-1: cloud adoption studies

4.1 Benefits and Drawbacks of Cloud Computing

Prior cloud computing adoption studies have found that the most important factors that prompted businesses to adopt cloud computing are cost reduction, scalability, and ease of use. On the other hand, the most prominent impediments to adopting cloud computing are concerns regarding the security and privacy of cloud computing.

Cost reduction is often viewed as the key factor that led to the adoption of cloud computing, if not the dominant one. Sobragi et al. (2014) found cost savings to be a decisive factor for firms to adopt cloud computing, and Morgan and Conboy (2013) found that cost savings were strong motivators towards adopting the cloud. Small business studies, such as Oliveira et al. (2014) and Carcary, Doherty, Conway, and McLaughlin (2014), also found that cost reduction was the most common benefit experienced by small businesses.

However, the importance of the cost benefit was not supported by all studies. In the Asia-Pacific context, Gupta et al. (2013) found that cost was the third most important factor, with ease of use, and privacy and security perceived to be more important than cost. Likewise, while Yazn et al. (2013) recognised that the low capital expenditure encouraged smaller firms to adopt the cloud, particularly start-up micro businesses, the discussion of the cost

aspect of cloud computing is very limited. A possible explanation for this difference could be due to different business environments. Yazn et al. (2013) studied firms in information-based service industries, such as IT, business services and education. The Asia-Pacific context of Gupta's (2013) study is also likely to give rise to contextual differences in the operating environment.

Scalability refers to the ability to adjust capacity accordingly to seasonal trends and business growth. For some firms, it was a decisive factor to adopt cloud computing (Sobragi et al., 2014). The ability to change the amount of computing resources provided allows firms to control their operations and IT infrastructure more effectively, and significantly reduce the development time to release new products (Morgan & Conboy, 2013; Yazn et al., 2013). However, the benefit of scalability appears to be dependent on the industry and nature of the business. Some businesses, such as information based service industries, did not perceive scalability to be a benefit (Yazn et al., 2013).

Ease of use was another important factor that can potentially assist or hinder cloud adoption. It is becoming an expectation that cloud services are easier to use than their desktop predecessors (Yazn et al., 2013). Gupta et al. (2013) found that ease of use was even more important than cost reduction, although the definition of ease of use in that study included the experience on mobile devices. Software applications that are more straightforward and intuitive can ease the process of transitioning employees onto the new, cloud-based services (Morgan & Conboy, 2013).

Concerns of cloud computing primarily stemmed from uncertainty over the security of the data. A considerable portion of security of the cloud system relates to the business' loss of ownership over its data, and the associated privacy concerns. The cloud computing model induces uncertainty and concerns from users due to the fact that the users may not be fully aware of the security implications of cloud-based systems (Benlian & Hess, 2011). Yazn et al. (2013) found that the business' trust towards the cloud provider is crucial in alleviating the security concerns. This trust can be built by the signing of confidentiality agreements between the client and the cloud service provider, as well as geo-restriction conditions that stipulate where the servers and data are physically stored (Sobragi et al., 2014; Yazn et al., 2013). Some, however, perceive cloud to be secure enough, and smaller firms were

generally more willing to trade security for convenience (Gupta et al., 2013; Oliveira et al., 2014; Sultan, 2011).

4.2 Organisational

In addition to the merits of IS itself, the characteristics of the adopting firm itself are also highly relevant to the decision to adopt new information system. Based on prior literature, the prominent organisational factors include the owner's characteristics and firm size.

Owners' characteristics had been identified by Thong (1999), who noted that smaller firms tend to have a more centralised decision making structure. As a result, the owners' attitude and management style exerts greater influence on the firm's decisions. Prior literature had consistently identified the owner's IT knowledge as a prominent factor. Cragg and King (1993) found that small business owners and managers that were more enthusiastic towards IT technology were more likely to adopt new IS for their businesses, while businesses whose owners had limited IT expertise and time were less supportive towards adopting new IS. Owner-managers generally play the crucial role of providing support to the adoption of new technology through active championing (Mehrtens et al., 2001) and allocating the necessary resources (Yazn et al., 2013).

Firm size had been identified by a very large number of IS adoption studies as a relevant factor (for a summary, see Oliveira and Martins (2011) or Yazn et al. (2013)). Yet, empirical observations had not been consistent. Conventionally, larger firms were believed to be more likely to adopt new IS, due to the fact that larger firms have access to more resources and expertise, which improves the quality of said adoption (Thong, 1999). Furthermore, the resourcefulness of larger firms make them relatively better equipped to handle failures in IS adoption (Sadowski, Maitland, & van Dongen, 2002). This appears to be supported by Oliveira et al. (2014); and Low et al. (2011). However, Mehrtens et al. (2001) found no apparent relationship between internet adoption and firm size, while Yazn et al. (2013) found that small businesses were, in fact, more likely to adopt cloud computing. These observations are likely to be due to the fact that smaller businesses have more flexible organisational structures that allow them to adopt IS more easily and rapidly (Sadowski et

al., 2002), and that both internet-based services (cloud computing included) lower the barriers to conducting business.

4.3 External Environment

Despite the differences in the characteristics that exist between information systems, competitive pressure and customer pressure were consistently identified as the primary sources of external pressure. In the meantime, service providers and consultants can play an important role in supporting businesses to adopt cloud computing products.

Competitive pressure can be a powerful source of motivation for adopting IS, but empirical studies thus far report inconsistent findings. Cragg and King (1993) found that small firms consider IT as a competitive necessity to maintain their own competitive position. Mehrtens et al. (2001) concurs that businesses may be expected to adopt certain information systems (such as the internet), so that they appear competent and up-to-date (Johnston & Vitale, 1988). Low et al. (2011) found competitive pressure to be a significant variable in cloud computing adoption. On the other hand, several studies have found no relationship between competitive pressure and adoption behaviour (Oliveira et al., 2014; Thong, 1999; Yazn et al., 2013).

Alternatively, customers are another major source of pressure. The demands from the customers can be a powerful motivator for firms to adopt new IS, and businesses are less likely to adopt new information systems when no such needs exist (Lin & Chen, 2012). On the other hand, some customers may be reluctant to use new technology, which may hinder the adoption. In the case of cloud computing, the risks associated with relinquishing control can potentially cause clients to discourage the firm from adopting cloud-based software (CCH, 2013).

Finally, external experts may play an important role in supporting firms' decision to adopt cloud-based systems. Frequent contact with experts can help the firm to utilise its IT systems more effectively (Cragg & King, 1993). Similarly, in terms of encouraging businesses to adopt cloud systems, cloud vendors play a very important role through promoting their products and providing clarification regarding the nature of their services. Yazn et al. (2013)

found that the lack of supplier support have made it more difficult for firms to evaluate the relative benefits of cloud-based packages, which subsequently hindered their willingness to adopt the cloud.

Chapter 5. Research Gaps, Questions and Model

Based on the review of the literature on cloud computing and relevant empirical studies, this chapter identifies the gaps within the body of literature reviewed, and poses the research questions that this study seeks to answer. This section also defines the parameters and scope of this study, and specifies the model that is used to guide research direction.

5.1 Research Gaps

First and foremost, research into the business perspective of cloud computing is limited. The business perspective is concerned with the ways cloud computing can provide value to customers (Marston et al., 2011). Until recently, few studies had investigated the factors that motivated or discouraged businesses to adopt cloud computing (Hoberg et al., 2012).

Based on the review of empirical studies on cloud computing adoption, the existing pool of literature does not provide a consistent body of evidence, from which inferences can be drawn reliably. As the studies use a variety of theories and perspectives, the studies retains a high level of autonomy to pick specific benefits, limitations and risks of cloud computing. This feature is criticised in the TOE framework (Yazn et al., 2013). More importantly, the studies tend to quote the definition of cloud computing directly from Mell and Grance (2011), which is highly abstract and is very ambiguous in scope.

The lack of studies in the accounting industry is also a major gap. Cloud computing in accounting industry is experiencing much more rapid growth than other industries. Yet, little is known about the reasons or the factors that fuelled this growth, as there were no studies on cloud phenomenon in accounting firms. Also, due to the differences in business environment between different industries, it is very likely that the accounting industry differs considerably from the other industries.

Gaps	Implication
Lack of demand-side cloud computing adoption studies.	There are inevitably fewer studies of cloud computing adoption, which means that the empirical support for the previous findings is weak.
Ambiguous scope of cloud computing	Cloud computing is an abstract concept. Without carefully defining what cloud computing does and how it supports the business' process, the ambiguity of cloud computing becomes so large that the results have little comparability.
Lack of studies that are specific to the accounting industry, despite the popularity.	The business environment in each industry is unique, which means that findings cannot be generalised to other industries reliably. As a result, understanding of why cloud computing is so popular in the accounting industry (and not others) is non-existent, due to the lack of literature.

Table 5-1: Summary of gaps identified

5.2 Research Topic and Question

This study seeks to provide some empirical evidence towards the research gaps discussed above. This is an exploratory study that investigates the factors that motivated small accounting firms to adopt cloud-based technology, and the implications for the accounting sector as a result of the popularisation of cloud computing.

Specifically, this study addresses the following questions:

1. What are the roles that cloud computing play in the professional accounting services industry, and how do the roles differ from each other?

2. Why do accounting firms choose to adopt cloud-based software solutions for their business, and for their clients? What are the factors that motivated or discouraged the adoption of cloud computing?
3. What are the accountants' perceptions towards the cloud computing paradigm? What are the likely implications of cloud computing for the accounting industry?

5.3 Scope of Research

5.3.1 Small Businesses

This study focuses primarily on smaller accounting service firms, for the following reasons: (i) prior literature had explicitly recognised the different IS adoption behaviour between small firms and large firms, (ii) larger accounting firms are often influenced by their parent organisations, and (iii) cloud computing is expected to be much more beneficial to small businesses than their larger counterparts.

The distinction of “small” businesses is significant in the IS adoption literature, as the adoption models for larger firms are not transferable to small businesses (Kuan & Chau, 2001; Sadowski et al., 2002; Thong, 1999). Small businesses face drastically different circumstances and challenges from their larger counterparts. Generally speaking, small businesses are characterised by their inherently more flexible management structure (Sadowski et al., 2002) and highly centralised decision making authority (Thong, 1999). These features allow them to adopt new IT innovations more rapidly than their larger counterparts. On the other hand, smaller businesses face fiercer competition, and their access to financial and human resources are more limited (Kuan & Chau, 2001; Thong, 1999). This makes it more risky for small businesses to adopt IS innovations, as their lack of resources may prevent them from deriving the full benefit of new technology (Iacovou et al., 1995), as well as placing them in a more vulnerable position if the adoption of the new system fails (Sadowski et al., 2002).

Because almost all IS adoption studies are conducted overseas, the term “small” should be interpreted in light of other countries' standards for small businesses. New Zealand businesses that employ fewer than 50 people comprise 99% of total businesses, and

account for 44% of overall employment (Ministry of Economic Development, 2011). Moreover, at 19 employees or fewer, New Zealand's definition of small to medium enterprises (SMEs) is much lower compared to other jurisdictions. For example, European Union (EU) defines small businesses as 50 employees or fewer and SMEs as 250 employees or fewer (Centre for Strategy & Evaluation Services, 2012), while Singapore's definition of SME is 200 employees or fewer (Spring Singapore, 2014).

Country	Employee	Financial	Source
New Zealand	20 or fewer	None	(Ministry of Economic Development, 2011)
European Union	250 or fewer	EUR 50 million or less turnover, OR EUR 43m or less balance sheet total	(Centre for Strategy & Evaluation Services, 2012)
Australia	No standard definition		(D&B Small Business, n.d.)
Singapore	200 or fewer	S\$100m or less annual sales	(Spring Singapore, 2014)

Table 5-2: Comparison of the definition of small business with other countries

Moreover, smaller businesses are more likely to adopt cloud computing than their larger counterparts. Large firms generally have more organisational obstacles to adopting new IS, such as: greater retrenchment and resistance to change by staff (Benlian & Hess, 2011; Marston et al., 2011), existing IT investments in the form of sunk costs (PwC, 2011) and greater concerns towards the security and privacy of their data (Sobragi et al., 2014). Since these obstacles are organisational-level, they are less relevant to the technology being adopted.

5.3.2 Cloud Adoption

The term “cloud computing” encompasses considerable ambiguity, as cloud computing can refer to a large number of applications and forms. For the purpose of this research, “cloud computing” for accounting firms is categorised into two roles: cloud computing offered as client service; and cloud computing for practice management.

The distinction of the two roles is based on the internally and externally focused applications proposed by Clemons (1986). Externally focused applications add value by bringing real benefits to the firm’s customers, as well as the firm itself. Internally focused applications are usually invisible to the firm’s customers, and add value by providing benefits to the firm only. This distinction is important for analysing how information systems contribute to a firm’s competitive advantage, as the purpose, features and benefits of an externally focused application differ considerably from that of an internally focused system.

The client service role of cloud computing emphasises the accountants’ capacity as business advisors for their clients. Business advisory requires extensive information sharing between the accountant and the client, and accountants may be directly involved in managing their clients’ accounting information system (CCH, 2013; WorkflowMax, 2013). In this role, cloud computing refers to the cloud-based software packages that support the client’s accounting system, which may be managed by the accounting firm. The cloud-based accounting software applications are intended to create value for the client, and the accounting firm does not derive any benefit from adopting the system other than fees from its clients. Xero is the most frequently used cloud-based accounting software.

The practice management role focuses on the use of cloud computing by the accountant firm to manage its own internal process. The practice management system is internally focused, which means it does not interact directly with the clients, and that the accounting firm adopts the practice management system as the final user.

This distinction between client service and practice management is particularly important, because although both can be called “cloud computing”, the differences in their intended purpose mean that the factors that motivate their adoption are likely to be very different. This distinction is also a contribution to the literature, as existing cloud computing adoption studies do not appear to explicitly differentiate between the two roles.

5.4 Model Development

The research model is depicted in Figure 2. The depiction provides a visual illustration that differentiates the two aspects of adoption discussed in this section, and the theories that are primarily used to study the adoption behaviour.

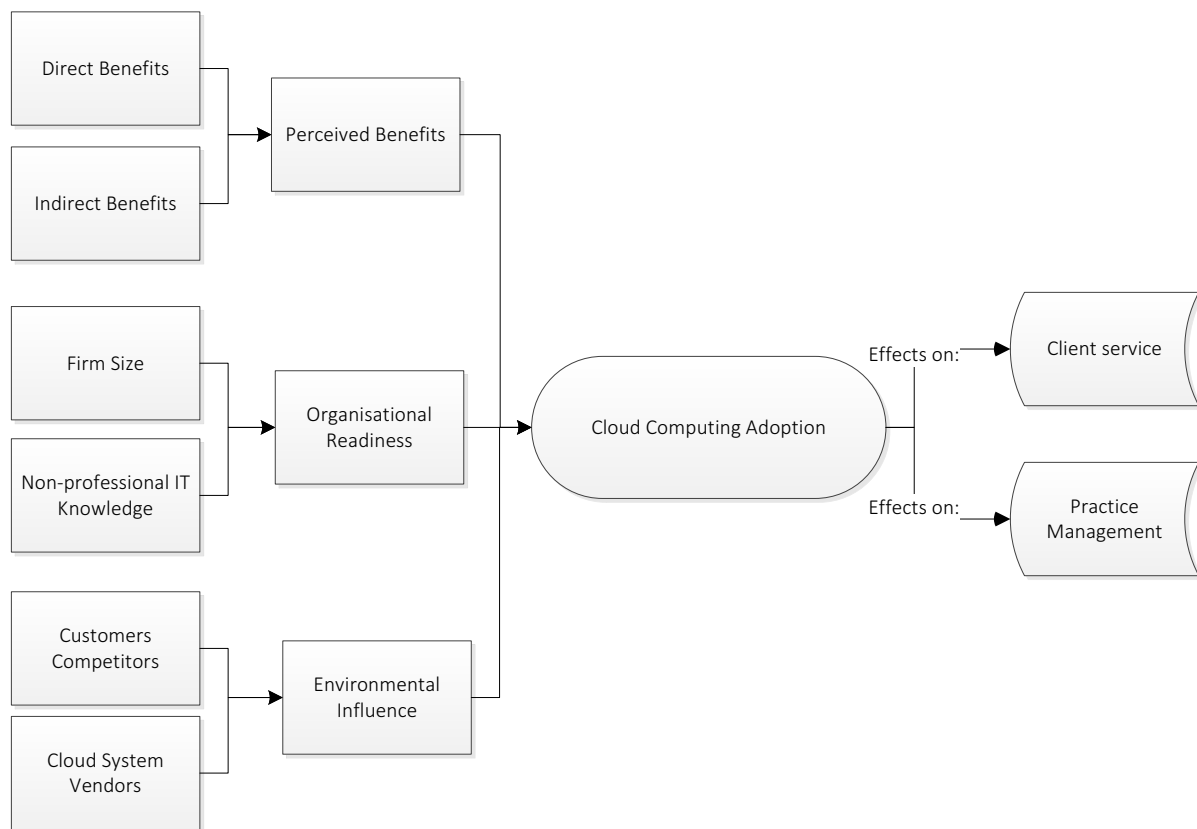


Figure 2: Research model

This research model is based on Iacovou et al. (1995) and Mehrtens et al. (2001), which featured the same three base categories: perceived benefits, organisational readiness and external pressure. In this study, the external pressure factor was renamed to environmental influence, to recognise that not all external influences are necessarily bad. Also, this study substituted EDI Integration for effects on client service and practice management. This is to

recognise that cloud computing comprises two roles. The two roles correspond to the discussion of “cloud adoption” in Section 5.3.2.

Each of the three base categories is split into two subcategories. For Perceived Benefit, direct benefits refer to tangible, explicit and easily quantifiable benefits as a result of adopting cloud computing, such as reduced cost and improved efficiency. Indirect benefits refer to the more subtle yet profound effects that are difficult to quantify, such as market competitiveness and firm image.

In Organisational Readiness, the two observed factors are firm size and non-professional IT knowledge. The former is included because of the inconclusive findings regarding the relationship between firm size and IT adoption. The latter is derived from Mehrtens et al. (2001), who found that, within the context of internet-based technology, non-IT professionals (particularly the owners) played a significant role in its adoption, while the role of IT professionals was negligible. Due to the nature of reduced maintenance, the staff’s and partners’ expertise in computers and technology is even more crucial in accepting the cloud concept.

Lastly, external influence covers both the pressures from external stakeholders and the support from them. Pressure from customers and competitors are interrelated, as they arise from the same fear. Customers would leave the accounting firm in favour of its competitors if their needs are not met (customer pressure), or if the competitor adopts products that better fits the customers’ needs and wants (competitive pressure). Alternatively, cloud system vendors may also have considerable influence on the firm. It should be noted, however, that the influence is not necessarily negative. Cloud service vendors may offer incentive programmes and establish collaborative relationships with the accountants.

Chapter 6. Research Design

This chapter details the methods that are used to carry out the research, and provides justifications for the chosen methods. According to McKerchar (2010), a typical research design consists of three consistent and coherent components: research framework, methodology and methods. The three components are discussed in the sections below.

6.1 Research Framework

Research framework is the fundamental, intuitional beliefs of reality the researcher holds towards the phenomenon (McKerchar, 2010). This study adopts a research framework of postpositivism, which implies the ontological position of critical realism. Critical realism is the belief that, while an external reality exists independently to the subjective assessment of the observers (researchers), the understanding of that reality is influenced by the observer's sensory experience and other mediums (Bisman, 2010). Subsequently, the purpose of postpositivist research is to identify "structures that give rise to actions and events that can be experienced in the empirical domain" (Wollin, 1996, as cited in Bisman, 2010).

As the study is intended to be exploratory in nature, the postpositivism framework is particularly suitable. The purpose of this study can be viewed as discovering an external phenomenon that is already in effect (i.e. the adoption of cloud computing by accounting firms). Postpositivism is better suited to this study compared to positivism and interpretivism, because positivism's naïve realism ontological perspective cannot accommodate for multiple or inconsistent findings (hence, unnecessarily restricting the findings of this study and loss of valuable information). Interpretivism, on the other hand, is too context-specific, which would constrain the exploratory value of this study.

6.2 Methodology

Methodology is the intermediary between philosophical beliefs and specific methods employed, and determines the general direction how the research is conducted (McKerchar, 2010). While methodology conventionally refers to quantitative and qualitative approaches,

many researchers, including Bryman and Bell (2011), questioned the extent of opposition between the two approaches, as there is no deterministic relationship between quantitative/qualitative approaches and philosophical beliefs. Furthermore, as postpositivism is a middle-ground between positivism and interpretivism (Bisman, 2010), the simple distinction between quantitative and qualitative is no longer useful. This study adopts a primarily inductive methodology, through the use of qualitative methods.

Inductive approach is the process of building theories from empirical observations (McKerchar, 2010). In contrast to deduction, inductive approach focuses on generating meaningful theories and explanations that are context- and population-specific, rather than universally-applicable rules or laws. This feature is consistent with the purpose of this study, which seeks to gain detailed information (i.e. *how* and *why* questions) and create new theories, rather than testing existing theories. Deductive approach, on the other hand, would be less effective in this particular study, because existing empirical studies is very limited, and a deductive approach would result in very little gains in new insights.

This study is carried out using the multiple case study design, and semi-structured interviews are used as the primary method of data collection. This methodology is selected due to its effectiveness in addressing the research questions and gaps in literature.

6.2.1 Multiple Case Study

Case study is typically used to “...[understand] the dynamics present within a single setting” (Eisenhardt, 1989, p. 534). The focus of case study is to make observations, where the researcher does not seek to influence the behaviour of subjects (Yin, 2009). Because case studies are less reliant on prior empirical studies compared to methods such as surveys and experiments, case studies are especially suitable for developing theories on emerging phenomenon that have limited, weak or inconsistent theoretical framework (Eisenhardt, 1989). As discussed previously, empirical studies on cloud computing adoption are limited and too disperse to form a solid theoretical framework. The fact that case study does not depend on existing empirical evidence and the ability to generate theories makes case study particularly appropriate for this study.

Multiple-case study method retains the ability to collect and analyse data that is rich and detailed, and provides greater external validity over single-case studies. The different cases in a multiple case study provide multiple perspectives that can be used either to reinforce the theory through replication logic, or examine cases with opposing characteristics as rival theories (Yin, 2009). Multiple-case study also reduces the extent to which the case is overly narrow or idiosyncratic due to specific factors associated with certain cases (Eisenhardt, 1989). Given that prior research on the area of cloud computing for accounting industry is virtually non-existent, the multi-perspective provided by the cases is a crucial contribution.

The unit of analysis for this study is organisation level, as it allows the research to be focused on the accounting firms. A case consists of a single chartered accounting firm. When an accounting firm has multiple branches, a case consists of a single branch of the firm. However, care is taken that only one branch of a national network of firm is selected.

For this research, studying a single industry of accountancy contributes to the internal validity, as the industry provides a control that eliminates the differences due to industry characteristics. Furthermore, because accounting firms are highly homogeneous, the firms' own circumstances are less likely to vary significantly, and there is a reduced likelihood of "noise" that may be present in the findings.

6.2.2 Data Collection

The subject firms were selected on the basis of replication approach. Under this approach, data collection and data gathering is simultaneous. Data from each firm is collected individually and analysed, the findings of which determines whether further cases are necessary, and the characteristics that are useful in reinforcing or contrasting with existing evidence (Yin, 2009). Six cases were investigated, which provided a suitable balance between providing a robust empirical grounding, and the complexity and resource constraints (Eisenhardt, 1989).

The cases were chosen primarily from the list of accounting firms that are partners with Xero and MYOB. Xero and MYOB are cloud service providers that establish relationships with accounting firms to provide support to their product. Both firms publish the list of their

accounting firm partners on their respective websites. Existing contacts are also utilised whenever they are available.

6.2.3 Semi-Structured Interviews

The decision makers and the IT champions within each accounting firm are identified, and a semi-structured interview is undertaken with up to two of them. Interviewing two people ensures that information is gathered from both the internal practice management perspective and the external client service perspectives. It is expected that each interview takes between 30 and 45 minutes.

Semi-structured interview results in richer and more detailed information to be gathered (Bryman & Bell, 2011). A semi-structured interview consists of a basic plan of topics and questions that guides the interviewing process, but the process allows for flexibility as the interviewer can deviate from prescribed topics in order to seek greater detail, perspective or uncover new information. The flexibility of semi-structured interviews is particularly useful for seeking explanation and details in each case, without being too restrictive.

Chapter 7. Within-case Findings

This chapter provides the results for the six case firms, and the factors that were significant in adopting cloud technologies are analysed. Table 7-1 provides the profiles of the interviewees.

In addition to the accounting firms, a manager from a cloud-based software provider is also interviewed. A cloud service provider provides a complementary perspective, as he would be in a better position to comment on the industry as a whole.

Firm	Interviewees
A	Partner of the firm, who is responsible for offering software products for clients and deciding the information systems to use within the business.
B	Business systems specialist within the firm, who is responsible for recommending information systems to the firm's clients and the final decision makers within his own firm.
C	Directors of the firm, who are responsible for deciding how the firm's information system is managed, and what products and services to offer to their clients.
D	Director of the firm, who makes the decision on how the firm's information system is managed, and what products and services to offer to clients.
E	Senior manager of the business advisory department, who actively championed the use of cloud computing in business advisory services.
F	Director of the firm, who makes the decision on how the firm's information system is managed, and what products and services to offer to clients.
n/a (Provider Omicron)	Accounts manager of a major cloud system vendor, who communicates with accounting firms and promote cloud-based solutions to them.

Table 7-1: Summary of Interviewees

7.1 Firm A

Firm A is a small accounting firm located in Christchurch. Its primary business lines consist of transactional accounting services (such as bank reconciliations, receivables, payables and payroll) and information system consulting (implementing appropriate IT infrastructure for clients' business needs). Business advisory is limited to operational issues, such as budgeting variance analysis and cash flow planning. Audit or assurance services are not offered. Its clients are predominantly agricultural and construction businesses around the Canterbury region. The business employs approximately 10 employees in total.

The firm has two partners, each managing one of the two business lines (bookkeeping and IT consulting). The accounting function is managed by a single partner, who oversees the strategic and business processes, including determining what software and information systems are used to address clients' specific needs and manage the firm's own operations. The IT business line provides a wider range of IT-related consulting and implementation for clients, such as: server setup, email and systems development using off-the-shelf software.

The interview was undertaken with the accounting partner, who is both a chartered accountant and had experience working with IT projects.

Enablers/Inhibitors	Client	Practice Management
Adoption	Yes (Xero, WorkflowMax) Since 2008	Yes (cloud-based SaaS)
Benefits	Flexibility w/ services Easy to use (for clients) Communication w/ external parties Short-term commitment	Flexibility in supporting business process
Limitations/risks	<i>Lack of Feature</i>	None
Organisational	Owner's IT expertise Access to IT expertise Outsourcing of bookkeeping	Owner's IT expertise Access to IT expertise Prior IS arrangement Firm size
Firm size	<10 employees	
Environment	Client pressure Software ecosystem	Vendor support Ecosystem (linkage w/ clients' products)

Table 7-2: cloud adoption for Firm A

7.1.1 Cloud Computing for Client Service

Firm A offers Xero and WorkflowMax to its clients for accounting solutions and workflow management, respectively. Clients are given access to their own Xero and WorkflowMax accounts, and they can input day-to-day transactions into the systems. Examples include: inputting timesheets, recording sales and purchase invoices, and perform bank reconciliations. Firm A, however, retains full control over the clients' accounts.

For Firm A, an overwhelming motivation to offer cloud-based accounting software to its clients is the perceived business opportunity. Cloud-based packages provide opportunities for accountants to provide greater value to their clients:

“Traditionally, accountants have been focusing inwardly, and as such have been promoting the use of software that helps them at their end but not taking into account the needs on a day to day basis of the client. Many of the new products to market have been developed with the client in mind so if you can help implement these types of solutions the client is getting far greater value and it demonstrates the value you are able to bring – ultimately bringing clients closer.”

Cloud-based software has allowed the firm to become more flexible. Flexibility is interpreted as the ability for the cloud-based software to match to clients’ needs:

“The business outsources some of our data-entry work to external parties, so we were looking for products that had the best functionality and provided the maximum efficiency / productivity gains... Xero suited our business model well [as an account manager and bookkeeper]... [Also,] the range of add-ons makes it very valuable for [our] clients across their entire business”

For Firm A’s clients, the ease of use and intuitiveness was an important consideration, and one major factor that led to the choice of Xero. An example of Xero’s ease of use is the bank reconciliation process, a process that is essential to managing the cash flow of a business, yet a complex concept in accounting:

“With Xero, all [the clients] need to do is click ‘match’, and it will do all the work for you. The tick-and-match process is very intuitive, and the client doesn’t need to know anything about how to prepare a bank reconciliation statement.”

When asked about the security of cloud-based software, the interviewee does not perceive it to be a major risk, as they did not affect online banking services from becoming popular, despite the sensitive nature of transferring money:

“Online banking had been around for years, and everyone uses it... People don’t feel that it’s unsafe to transfer money over the internet anymore... And the same thing will probably happen to Xero once it gains critical mass. Xero’s a good place to start for those [clients] who want to get their feet wet with the whole cloud thing.”

While external pressure was not a prominent threat for Firm A, the interviewee identified that clients may exert considerable pressure on accountants that are unwilling to adopt cloud. The benefits of cloud-based accounting software are intended to appeal to non-accounting professionals, rather than accountants themselves:

“Xero is designed with non-professionals in mind, not accountants. Xero is designed in such a way that hides the ugly accounting behind its intuitive interface. Accountants, on the other hand, don’t necessarily find Xero to be any easier to use than what they’re used to... In a way, some accountants are ‘forced’ to adopt cloud-based software because that’s what their clients want”.

Also, the software ecosystem played a significant role in convincing them to stay with Xero. As Xero had been around for longer than its competitors, it was able to establish a stronger software ecosystem:

“We currently have no intention to replace Xero with any alternatives. We were using Xero for a long time, and so we have become experts in its use... Also the range of add-ons makes it very valuable for clients across their entire business.”

7.1.2 Cloud Computing for Practice Management

Firm A also utilised cloud-based packages for managing its own practice. Xero and WorkflowMax are used to manage the business accounts and processes, respectively. The firm also uses Dropbox for file sharing and Microsoft SharePoint for collaboration.

Firm A enjoys a convenient access to IT expertise, due to the fact that the accounting partner has previous experience in IT projects and the firm's close proximity with the IT consulting division. The expertise also allowed the firm to operate an in-house remote access-based system in a similar manner to cloud computing:

"Prior to cloud computing we had a server in-house that kept our clients' accounting data and a Microsoft Exchange email system. We can access the files via the terminal server... So when the cloud computing concept gained traction, it's really a logical step for us to make."

The decision to adopt cloud-based software systems for internal business management followed the business' desire to be flexible:

"We have a team overseas that does all our bookkeeping for us, and we have to be highly flexible to ensure that we provide our clients with all the right services... Cloud systems are so much easier, in the respect that we can get whatever software we need at a moment's notice, without having to invest a lot of money in hardware".

7.2 Firm B

Firm B is a medium-sized chartered accounting firm located in central Christchurch. It employs approximately 50 staff members. As a full-fledged accounting firm, its accounting services include: compliance (preparation of financial statements and tax returns), tax consulting, business planning and growth, management consulting and accounting, and auditing. In addition, Firm B also offers information technology services, which assist clients with selecting and implementing new software for managing their businesses, as well as providing training. The firm services a diverse portfolio of clients, both for-profit and not for profit entities.

Firm B had no branches in other locations, which allowed it to operate in a largely autonomous fashion. Despite the fact that the firm is affiliated with an international

accounting group, inter-firm collaboration is limited. Firm B is managed by several partners that specialise in different business lines. Moreover, while the firm has an in-house information system department, the role of the department is emphasised on the business potential of IT innovations, instead of routine maintenance.

The interview is carried out with the systems manager, who is responsible for participating in the latest developments of accounting information system innovations and recommending them to the final decision makers.

	Client	Practice Management
Adoption	Yes (Xero) Since 2011	No (in-house server)
Benefits	Strategically beneficial Easy to use (for clients) Easy to maintain Flexible (clients) Security (internal control)	<i>None (no incremental benefit)</i>
Limitations/risks	<i>Lack of features</i> <i>Perceived data safety</i>	<i>Lack of features</i>
Organisational	IT expertise Firm size	<i>Firm size is too large</i>
Firm Size	Approx. 50 employees	
Environment	Competitive pressure	None

Table 7-3: cloud adoption for Firm B

7.2.1 Cloud Computing for Client Service

Firm B heavily focuses on cloud-based accounting packages, notably Xero. This is evident from the fact that Xero was listed as a separate service line on the firm's website. Both Firm B and its clients have access to the accounting file. The clients would input their day-to-day transactions into Xero, and Firm B would use the information to prepare reports and

provide advisory services based on the information. Cloud-based solutions are also used to assist clients with their budgeting and reporting needs.

The reason that Firm B was so proactive in promoting cloud-based accounting software to its clients is due to the re-evaluation of the fundamental purpose of accountants. Notably, accountants' values lie in helping businesses create value, rather than manipulating numbers:

“We [the accountants] are not just these mysterious people who sit behind their desks all day, crunching numbers and completely unaware of what’s going on out there in the [business] world.”

The interviewee went on further to state that one of the key benefits of cloud-based accounting packages is the ability to monitor clients' accounting records and compile reports in real time:

“Accountants have traditionally been the ambulance at the bottom of the cliff. Accountants create reports using their client’s historical data, and by the time the accountants got hold of the report, the issues would have become worse...”

“Cloud computing allows accountants to be the fence at the top of the cliff, rather than the ambulance at the bottom. [Cloud-based accounting systems] provide accountants real-time access to clients’ file, which allows us to pick up and act on business problems immediately rather than a few months down the track.”

Moreover, cloud-based accounting systems also have the added benefit of lowering the level of maintenance of clients' accounts. It is worth noting that “maintenance” in this case refers to maintaining the accuracy of the client's accounting files rather than IT infrastructure. The lack of customisation and ease of use make cloud-based accounting software are less prone to clutter, and allow accountants to rectify any problems more easily:

“Some people [accountants] say Xero is too simplified, but that’s just old accountant thinking. People [non-accounting professionals] can be surprisingly reckless when it comes to stuffing up accounting records, and it’s easier to fix problems in a simple system than a complex one... Plus, with cloud-based software, you can do it remotely.”

While ease of use is generally believed to be a benefit for non-professionals, Firm B reported that Xero’s ease of use accrues benefits in terms of reductions in non-value-adding activities:

“It’s much easier to set up a business [account] in Xero than MYOB... When all we need to do is to prepare a set of reports for the client, MYOB asks a lot of questions [when setting up the company account]; Xero is more usable ‘out of the box’... With Xero we’re spending less time setting up a company account... [Our] clients want reports, and Xero provides these reports quicker.”

For clients, cloud-based accounting packages provide value in the form of greater flexibility. For example, cloud-based systems allow better concurrent access:

“One of our clients was a husband-and-wife shop, and previously used a desktop-based accounting software to manage their accounts. The husband entered invoices, and the wife did the banking. Since everything gets entered into the same system, they would always fight over the computer access... With Xero, they don’t have the problem anymore: they can both be putting data into their Xero accounting file at the same time, and they don’t have to use that one computer to do so.”

Likewise, the ability for cloud-based software to interface with other data sources provide users greater flexibility in terms of performing their tasks,

“What generally happens [with traditional accounting system] is that at the end of each month, the owner has to spend days to find every invoice and receipt, and check

them off against their bank statement. This makes it difficult for the owners to do anything else during those days... Because Xero retrieves bank transaction data automatically on a real-time basis, they can reconcile bank account as they come in; effectively spreading [the workload] out throughout the month.”

Despite the numerous benefits that cloud-based software offer, the interviewee did not perceive cloud computing as a threat to the accounting industry. The professional capabilities of accountants are not substitutable by automation:

“Cloud[-based accounting packages] won’t replace accountants’ hard knowledge... If Xero really can replace accountants, it would have happened a long time ago with desktop-based accounting software... We [the accountants] are the experts, and we’re there to provide professional help when they [the clients] are not sure what to do... Cloud-based accounting software is actually helping us to extract better information from our clients with less time.”

In respect of the security of data stored in the cloud, the interviewee believed that the problem is one to do with people’s perceptions of security, rather than actual security:

“When people talk about the ‘security’ of the cloud, they are really referring to the physical control [of their data]. They feel safer when their data is stored on a hard drive, because it is something they can hold in their hands... But even then, hard drives can fail, and USB drives can get lost.”

Cloud-based software as a service may, in fact, be even safer than a non-cloud one in terms of internal control, as the users’ ability to manipulate the system:

“It’s harder to conceal stuff in a cloud-based system. [For desktop-based systems,] the auditors may be concerned that the users have modified their accounting software to

conceal some transactions... This is simply not possible to do in cloud software like Xero.”

In terms of external pressure, competition was a considerable motivator for cloud adoption:

“We decided to adopt Xero because we’re afraid that we might lose clients if we don’t...”

7.2.2 Cloud Computing for Practice Management

Firm B had already implemented a paperless office prior to the introduction of cloud computing. The server is kept on premise, which supports the desktop-based practice management system and document management. Documents and relevant business processes are kept in the firm’s intranet, and sharing of documents with external parties (such as auditors) is achieved by providing controlled access to the parties.

When the practice management system was first implemented, it was chosen due to the features and cost:

“When we were looking at practice managers, MYOB AE was the ‘best’ one we could find. It had all the features we need, and was the best value for money too.”

Additionally, the practice management system fills an important void that Xero did not fulfil: additional features that Xero did not provide.

“Not all of our clients are on Xero; we still keep a lot of our clients’ files on MYOB... The decision really depends on how complex the client’s accounts are, and how much customisation they need... For example, one of our clients has some subsidiaries overseas, so we used Xero for the overseas subs and MYOB AO for the New Zealand headquarters... Consolidating the accounts are simply too complicated [for Xero].”

Firm C

Firm C is a small chartered accounting firm located in Whangarei of North Island, New Zealand. It employs approximately 10 staff members. It provides the basic accountancy services that most other accountants do: assurance, business coaching and turnaround management; and compliance with taxation requirements. It does not appear to provide any IT-related services, however.

Firm C's clients are primarily small businesses and not-for-profit entities within the local community. The market for accountancy in Whangarei appears to be highly competitive, with many small chartered accounting firms servicing the local businesses and entities.

The interview is undertaken with the partners of Firm C. The firm had decided to implement a cloud-based practice management system, and the interview focused on exploring the decision maker's motivations and perceptions behind this decision.

	Client	Practice Management
Adoption	Partial (Xero) Since 2012	Yes (cloud-based SaaS)
Benefits	Improvement in service quality	Disaster recovery Reduced maintenance Security Cost (no additional IT investment)
Limitations/risks	None	<i>Dependency on internet access</i> <i>Location of cloud server</i>
Organisational	<i>Lack of IT expertise</i>	Firm size
Firm Size	Approx. 10 staff	
Environment	None (insufficient client demand)	Vendor pressure (changing product offering)

Category	Non-adopter	Ready adopter
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Table 7-4: cloud adoption for Firm C

7.2.3 Cloud Computing for Client Service

Firm C does not explicitly pursue a cloud-based strategy. While the firm offers Xero as an option for clients, it does not advertise Xero on its website, or have any preference between cloud-based and desktop-based software.

“We don’t recommend our client to change over to cloud system; we wait until the conversation emerges. Xero and MYOB are the most reliable; they are the two major ones [cloud-based accounting software] in the small business space.”

That being said, the interviewees did recognise that cloud-based accounting software can potentially provide a better quality of service to the clients:

“From a client’s perspective, using cloud gets their accounts finished a lot faster, because it’s easier to get the data. They also receive better service from our firm throughout the year, because if they’re stuck on whatever, they can ring us up and solve the problem immediately.”

7.2.4 Cloud Computing for Practice Management

Firm C outsources their IT maintenance function. An external IT firm ensures the smooth operation of the firm’s own servers and networks, while Firm C’s administrative staff member sets up the internal controls to the system and performs the necessary software upgrades when required.

Vendor pressure is the main reason for Firm C to adopt cloud-based practice management system. A combination of vendors dropping support for the existing system and the lack of non-cloud alternatives left Firm C with no choice but to adopt cloud:

“Most of the practice management software only offered cloud-based system, so actually we didn’t have a choice. We can stay on the system we’re currently on, but ultimately it would become obsolete within 12 months. We’ve asked one of the providers, and the best solution was on the cloud.”

“In terms of practice management system, there was one desktop provider, but they were a very niche firm and didn’t hold much market in New Zealand at all probably. Since half of New Zealand’s accounting firms were our size or smaller... the provider’s effectively telling us ‘if you want to be with us, it’s going to be the cloud. Take it or leave it.’”

Competitors are another likely source of external influence, as most other local accountants have adopted cloud-based systems. However, this can be interpreted in two ways: either Firm C felt pressured to conform to its peers, or the choices made by others provided confidence regarding the viability of the cloud:

“[For] the other three practice management system, we considered cloud system as well. There are about 30 accounting practices, and only one had a unique, in-house system that no one uses... At least half of those [accounting firms who adopted the cloud] migrated to the cloud in the last 12 months.”

For Firm C, the reduction in maintenance is the most significant benefit. This is unsurprising given the lack of resources, and the fact that the IT role is shared with administration:

“There are some efficiency benefits to having the software on the provider’s server. They [the providers] perform all the upgrades, ensure all software is running, manage the access issues... We don’t have the same requirements. It’s a speed improvement from our point of view.”

“For example, MYOB put out a new release, or a patch, whatever you call it... We had to install those ourselves on our server, and onto each of our desktop. It takes about half an hour to an hour to install on each computer, and it always take the administrator a day to do just that. Whereas with cloud[-based software], the update takes place at 2 in the morning and costs us no time at all.”

“The vendor that supplied the software to us would give some protection over security and unauthorised access... The administrator that comes in during the weekends to do upgrades would certainly like it when we migrate to the cloud”.

While the direct cost of cloud-based solution is similar with a desktop-based one, the interviewees noted that the hardware upgrade costs associated with desktop-based system can accrue rapidly:

“From the cost point of view, [the license fee is] about the same. [But] for some clients, their servers and desktops had to be more powerful to handle the computations on their own computers [hence necessitating the purchase of new hardware]. But with cloud, the hardware requirement’s lower. The older computers can be used as ‘dummy terminals’, and avoid hardware upgrade costs.”

Flexibility, the often-touted benefit of cloud computing, was not a major consideration for Firm C:

“Remote access is one [of the advantages of cloud computing], but not the main one for us; we don’t generally do work away from the office. A potential benefit may be to share information to the clients, but currently we don’t do that [sharing information from the practice management with the clients directly].”

In terms of potential weaknesses of the cloud, network access was identified as the most prominent threat to cloud computing. However, the interviewees acknowledged that network access is a part of unavoidable business risk:

“One of the major downside is that if the internet is slow or down, your whole practice grinds to a halt; whereas you can control your in-house practice manager to a large extent in terms of access and reliability. Once you go on the cloud, you’re more open [vulnerable] to the telecommunication companies when they have a system problem. That’s really the only negative I can think of.”

On the other hand, security was not perceived to be a major issue. This is partially due to the fact that other services that share the same underlying characteristics with cloud computing were already widely used:

“To a large extent, we’re using cloud system [Skype] to talk right now, and potentially millions of other people could tap in to this conversation. Yet we’re quite comfortable with that... Because the large cloud providers use UNIX systems to manage the traffic and logins, the level of risk is no different to cracking the logins on your own server. Anybody that logs into their bank account is using a cloud-based system to see what their balances are and pays their bills, and nearly everyone in New Zealand does that... I guess we’re all using cloud in some way, anyway.”

Furthermore, cloud-based solutions are likely to be safer in terms of repelling unauthorised access:

“Even if we’re not on the cloud, people could break down our firewalls and gain access to the same amount of information as if we’re on the cloud. We’re relying on the service providers’ security protocols, and the contracts we have with the service providers”.

Salient disasters, such as the Christchurch earthquake, played a role in raising people's awareness of certain disaster recovery needs, in which cloud computing was an appropriate choice for. Despite the fact that Firm C was not affected by the earthquake, it nevertheless provided a positive motivation to adopt cloud computing:

"I had a friend whose business was in the Red Zone. They were locked out of their businesses by the civil defence. They couldn't get access and had to set up [their temporary business] in someone's house, [but they] still couldn't get access to their server. There were backups, but they were in another building in the Red Zone, so they couldn't get their backups either. Effectively they were down for a quite a long time. Had they gone for the cloud, they would have been able to access at least some of their documents in the office. It's quite a good reason."

One important criterion for cloud-based services, however, is the physical location of which the servers reside:

"I knew quite a few people in Christchurch had migrated to cloud computing, because they don't want to expose their businesses to that risk. They actually wanted to know where their servers are located, so their data is not sitting in Christchurch."

7.3 Firm D

Firm D is a medium-sized accounting firm located in central Christchurch, and employs approximately 50 staff members. It offers a wide range of services, including compliance, assurance, business management, strategic advice, accounting for not-for-profit entities and trusts. The firm offers information services in terms of matching business requirements with appropriate IT systems, but does not explicitly advertise it or cloud-based computing.

Firm D is a part of a national network of independent firms, but it operates independently in terms of resources and business strategy. The Christchurch branch is managed by several partners that specialises in one or more service lines. The interview was undertaken with

the partner that specialises in business advisory, who was involved in providing cloud-based accounting software to clients.

	Client	Practice Management
Adoption	Yes (Xero, MYOB) Since 2012	No (non-cloud outsourcing)
Benefits	Strategic benefit Data sharing with clients	<i>Cost</i> <i>Reduction of maintenance</i> <i>Flexibility (remote access)</i> <i>Security/Disaster recovery</i> <i>Physical location of cloud server</i>
Limitations/risks	Lack of features and customisation	
Organisational	No factors.	<i>Firm size.</i> <i>Existing IT outsourcing.</i>
Firm Size	Approx. 50 staff	
Environment	Threat to business/competitive pressure <i>Clients' resistance towards cloud</i>	None.
Category	Unmotivated	Non-adopter

Table 7-5: cloud adoption for Firm D

7.3.1 Cloud Computing for Client Service

The principal motivation to offer cloud-based accounting systems for clients is the potential for automation, and the subsequent loss of revenue:

“Currently, number-crunching and compliance-based work takes up about 80% of an accountant’s job; and cloud-based accounting software will significantly change how the accounting industry works, which is currently heavily compliance-based...”

“[I think] Cloud computing will be essential to every accounting firm in five years’ time... Learning new skills and adaptability will be essential for accountants to keep in

business, or they will risk losing businesses [to cloud-based accounting software]... clients will demand accountants to provide more services for a lower cost, and those [accountants] who use cloud software will be in a better position to undercut the traditional accountants [that do not adopt cloud computing]”

In terms of perceived benefits, ease of use was perceived to be the biggest benefit of cloud computing, followed by the easier data access between the client and the accountant:

“Cloud-based accounting software provides accountants real-time access to clients’ financial data, which gives accountants huge opportunity to provide accounting-related services that have higher quality and integrity... Services like real-time reporting are turning accountants into teachers and advisors for businesses...”

“... Prior to cloud computing, boxes of accounting files and USB drives are moved between the client’s premise and the accountant’s... Sometimes the data gets lost, which is incredibly frustrating, and the client had to recreate those transactions...”

For Firm D, lack of features had been, and is continuing to be, a major obstacle in offering it to all businesses:

“We looked at cloud-based software about seven years ago, and concluded that they were still very immature... Their functions were so limited that they were only suitable for micro businesses... When their functions became more comprehensive and met our needs, we migrated to the cloud.”

It is also evident that clients are an important source of influence for Firm D’s adoption of cloud computing, in terms of their needs and their attitudes towards cloud computing.

“Not all of our clients are currently cloud-based. The main issue is the lack of features in Xero; for example, Xero doesn’t allow us to customise how reports look like... Also some clients are more resistant towards the cloud idea, as they were concerned that

they would no longer have control over their data once their accounting system goes in the cloud...”

Consistent with the others, the respondent did not perceive security as an issue. He believes that it is in the cloud service providers’ best interests and ability to provide the robust security and highly reliable for the users’ data:

“We’re not too concerned about Xero’s safety, because their[cloud service providers’] whole business model is based on keeping clients’ data safe. If a safety failure does happen, it would go out of business instantly... So Xero will do everything in its power to keep clients’ data safe”

7.3.2 Cloud Computing for Practice Management

Firm D had outsourced its practice management system to external IT providers. The servers are located within Christchurch, which indicates that cloud system is not used by either the IT outsourcing provider or Firm D.

The firm had rejected adopting SaaS, due to the fact that they did not provide the capacity for larger firms:

“We looked at the likes of WorkflowMax and decided that cloud software like WorkflowMax didn’t offer enough functionality or customisability to make them usable for us... They were clearly designed for small firms, so they didn’t fit the bill for us.”

Outsourcing the server was motivated by reduction in cost and maintenance, and improvements in reliability:

“We used to keep the servers in our office, and they were very noisy and cost a lot of electricity to run... The cost of renting the server space was roughly the same to the amount we paid for the server’s electricity...”

“The outsource provider takes care of maintaining the server for us... If we need any software, all we need to do is give the [IT outsourcing provider] a call, and they’ll take care of everything for us... We can access the software installed on the server anywhere via internet.”

“The [rented] servers are kept in reinforced-concrete bunkers down on Durham Street, and they [the vendors of the servers] have two backup diesel generators as well as redundancies... The data will be very safe in case there’s an earthquake, and we know exactly where the server is.”

Firm D has no intention to incorporate cloud technology in their practice management system, due to the apparent lack of benefits of doing so:

“We’re happy with the arrangement, and we can’t really see what benefits we would gain by moving to the cloud. We’re already paying a flat rate for the servers, we can retrieve data we need from anywhere anyway, and our IT provider is already taking care of maintenance and software... There has to be a very strong case for us to consider moving our practice to the cloud.”

7.4 Firm E

Firm E is the Christchurch branch of a large chartered accounting firm. Firm E’s IT system, as well as the many regional branches of the same accounting firm, are provided centrally by the headquarter office in Auckland. Firm E offers a wide range of services, including assurance, private business, tax and management accounting. Each service line belongs to a department; and due to the size of the firm, each department operates autonomously and largely independent from each other.

This study examined the private business division, which provides bookkeeping services and business growth advice to clients of varying sizes and industries. The private business

division had recently begun adopting cloud-based accounting software as a part of the services it provides to the client.

The interview is held with two people: a manager within the private business, and a frontline staff. The manager championed the adoption of cloud computing, while the staff had first-hand experience with using it for business operation.

	Client	Practice Management
Adoption	Yes (Xero) Since 2013	No (IT via HQ)
Benefits	Better service to clients Flexibility Data consolidation Ecosystem via add-ons	n/a
Limitations/risks		n/a
Organisational	Firm size	<i>Firm size</i> <i>Organisational Structure</i>
Firm Size	Large (>50)	
Environment	Competitive pressure Perception from clients	<i>Other branches</i>
Category	Unmotivated	Non-adopter

Table 7-6: cloud adoption for Firm E

7.4.1 Cloud Computing for Client Service

Despite (or perhaps because of) the business size, Firm E did not begin adopting cloud computing until 18 months ago.

The primary reason for adopting Xero is due to pressure from the industry:

“Cloud-based accounting software had previously been neglected by our firm... The customers are pressuring us to offer accounting products that have fewer options

[easier to use] and are more flexible... That's when the partner directed me to investigate Xero for our firm."

Xero is used as the default software package for new clients, but there is no intention to migrate all clients to Xero:

"We're not promoters of Xero, and we don't seek to push Xero to all of our clients... The decision whether to provide cloud to clients is made on a case-by-case basis. If the client's existing accounting system is working normally, we would leave it as it is... However, if the client doesn't have a proper accounting system, or needs a new accounting system, Xero is our first recommendation".

The respondent believes that cloud-based software like Xero is mutually beneficial, in that both the accountant and the client can benefit from the higher degree of flexibility the cloud-based solution offers. For instance, the one ledger system had greatly simplified the sharing of financial information between the accountant and the client:

"With [cloud-based accounting system], all of client's accounting information is stored in a single place that can be accessed from the web [e.g. within Xero]. So accountants constantly have the latest, up-to-date accounting information to work with, and any changes made by the client are instantly reflected. This eliminates the problem with different versions back and forth."

Xero is also more mobile-friendly than its competitors, offering apps for iOS and Android. This, combined with the one-ledger property, allows accountants to provide assistance with minimal delay:

"If a client is unsure whether a transaction is coded correctly in Xero, all I [the accountant] need to do is sign in to the client's accounting records on my phone and

check if they were coded correctly. It would only take me 10 seconds to check, and I can do it anywhere; including 10pm at home.”

Since the private business division also prepares end-of-year financial reports for clients, the flexibility trickles down throughout the year:

“Because we’re checking our client’s entries as we go throughout the year, we don’t need to ‘clean up’ our clients’ accounting records as much at the end of the year, when we need to prepare end-of-year accounts for them. This means less work for us at the end of the year, and their reports get done faster.”

Using cloud-based software also has the additional benefit of perceived value of the accountants’ service:

“When we use Xero, there’s less mechanical [non-value-added] work to do... This allows us to better focus on providing advisory services to our clients, rather than keying in numbers... Ultimately, advisory work is what creates the most value for our clients, and our clients will also perceive our services to be of better value for money.”

Xero’s rich ecosystem of add-ons also meant that clients that adopted Xero could obtain greater benefits by using the associated addons:

“One of the Xero addons we use analyses the financial statement... It creates graphs and models automatically based on financial data in Xero, and alert anything that requires our attention... Prior to Xero we created the models ourselves using spreadsheets, but they were very complex to create and understand... That Xero addon saved us a lot of headaches.”

Despite the benefits that Xero provides, however, the efficiency gains from adopting Xero are perceived as a bonus, rather than a decisive factor.

7.4.2 Cloud Computing for Practice Management

Firm E's IT system is linked with other regional branches and provided centrally by the headquarter office in Auckland. IT-related decisions are made at an enterprise level, and Firm E has no authority over the outsourcing decision. Nonetheless, the interviewee does not consider outsourcing to be likely:

"I don't think the IT system will be outsourced any time soon... Our practice management system is custom-built, and is linked with the national grid... The project to migrate the whole country's IT system is simply too large."

7.5 Firm F

Firm F is a small to medium accounting firm located in Christchurch. It is managed by a single director and employs about 20 staff members. The business consists of three main service lines: business advice for assisting clients to grow their business and overcome hardships; the accounting service that keeps accounting records and fulfils tax and reporting obligations; and a separate business line that specialises in assisting firms in the construction sector to implement a systematic set of IT tools to manage their accounting and operations. Additionally, the firm has its own in-house IT department and staff with IT background.

The interview is undertaken with the general manager of Firm F. The interviewee's role primarily provides advisory service to clients in the construction industry, and has a high level of decision making authority within the firm. The interview focused on two aspects: the decision to provide cloud-based software systems to clients in the construction sector, and the experiences regarding the cloud-based practice management system.

	Client	Practice Management
Adoption	Yes (Xero) Since 2011	No (abandoned cloud-based SaaS)
Benefits	Flexibility (for clients) Reduced maintenance (for clients) Cost (for clients; no commitment) Easy to use (for clients) Data consolidation Real-time reporting	Disaster recovery
Limitations/risks	Perception of Privacy	Under-delivery of features (hype) Network access
Organisational	IT expertise (on premise) Client portfolio	Destruction of existing IT infrastructure Migration costs
Firm Size	Approx. 20	
Environment	None	Relationship with vendor

Table 7-7: cloud adoption for Firm F

7.5.1 Cloud Computing for Client Service

Cloud computing has a significant presence in the firm's service lines. Firm F had adopted cloud-based software since 2008, and had established strategic alliances with a number of cloud-based software systems. The key cloud-based software being offered includes Xero, WorkflowMax and Advanced Business Manager (ABM).

The motivation for offering cloud-based systems is due to the benefits the cloud provides, and whether a software package is cloud-based or not is of little relevance:

"We don't market the cloud; we market the functionality of the software... Cloud is not one of the cornerstones we offer; it's just a way of facilitating what we offer."

The ability for clients to access their cloud-based systems anywhere via the internet, as well as the reduced need for maintenance, are two particularly important advantages for the construction sector:

“I think it’s got its base, and it’s good. It’s good for businesses such as trades and construction, where they’re field-based so they and their workforce can have access to centralised software system from anywhere... They also don’t have to worry about upgrades, servers or offices since a lot of them work from home...”

“Although desktop-based software can also be accessed remotely, there’s still the hassle of setting up remote access. A lot of the stuff the clients are doing is driven from site [away from their offices], so people would put in electronic timesheets, and purchase orders straight from the site. With cloud technology they can access all of them on their mobile devices”.

Cloud-based systems are particularly suited to the construction sector, due to the highly mobile nature of the work, and the lack of accounting and IT knowledge by most construction clients:

“They [the small construction firms] are perfect for cloud software because they generally don’t have an office, they became quite switched-on about smartphones and tablets, and [the cloud-based software] are generally cheap since they generally don’t need a server. For some of the clients [e.g. plasterers], all they have are their material lists, which were very simple. They don’t hold stock, and they they’ve only got 4-5 tasks to each work. Whereas for builders they’ve got a lot more jobs and each task is more complicated.”

Consequently, ease of use was much more important for non-accounting professionals:

“We offer both Xero and MYOB AccountRight. We would suggest clients to adopt AccountRight because they’re more familiar with that. But we generally push Xero. Even though it’s more expensive [than MYOB AccountRight], it’s just so easy to use... It’s intuitive, just like an iPhone, so clients can find their way around on their own.”

Firm F’s experience suggests that the firm’s clients favour cloud-based software, even when other non-cloud solutions are available. This is primarily due to the ease and low cost of setting up cloud-based systems:

“ABM, they do server, hosted or cloud. Pretty much everyone we’ve talked to took the cloud option. It’s cheaper, it’s easier and they don’t have to worry about [maintenance]... It’s probably cost more long-term but it’s more cost-effective in the short term... With up to \$50,000 paid to get everything configured and user licenses sorted out, the last thing we’d be doing is coughing up for a new server.”

An added benefit of cloud-based software is the enhanced communication between the construction firms and their own clients. For example, improved progress reporting and monitoring:

“The workflow is managed by cloud-based software; that is, milestones to the job, people can tick them off as they complete, and the client can check the progress in real time as well.”

In terms of the privacy and security of the data, the interviewee dismissed the plausibility of loss of privacy, citing that accounting records for small businesses are not likely to be targets of attacks:

“... A couple of people said they wouldn’t want their solutions in WFM or Xero, because of access to their data [accounting records]. They were worried that they didn’t own the data, and somebody would hack into it... There were some concerns

around confidentiality and sharing of data; Xero has a massive amount of data, and they might be selling some of them.”

“Realistically they’re small-time businesses, and no one’s interested in their data anyway. Besides, Xero can’t access the bank accounts directly via bank feeds...”

In terms of perception towards the cloud, the interviewee did not view cloud as a threat, but a tool that can be leveraged to provide better quality of service:

“[Cloud-based software] is not as threat to me though. It’s just another tool we can offer to the client in providing business management and accounting solutions to a level that could never be reached beforehand. For me, the ability to get clients’ accounting information and summary right now before I meet the client, it provides a whole different level of business advisory... It’s going to have its own space. It’s not going to be the be-all or the end-all.”

7.5.2 Cloud Computing for Practice Management

Firm F’s experience with cloud-based practice management system was predominantly negative. Following the Christchurch earthquake, Firm F had adopted WorkflowMax for eighteen months before returning to desktop-based systems.

The main reason for adopting cloud-based practice management system in the first place was a combination of concerns over disaster recovery, loss of existing system, and vendor relationship:

“We got turfed out of our building on February and we couldn’t get our server... People became very conscious about disaster recovery, and having a cloud-based system meant you can work anywhere. It’s more about the practicalities of working in a disaster zone.”

During the aftermath of a disaster, it is evident that the perceived importance of remote backup and systems continuity had been increased significantly:

“It was a combination between marketing and relationship, since we were a large provider of Xero in Canterbury... And we had to find a new premise without a server... If it hadn’t been through an earthquake we probably wouldn’t have moved to it [cloud-based practice management system]”

However, the sub-par performance of WorkflowMax, and the low quality of network access, forced Firm F to dismiss the cloud and re-implement desktop-based systems.

“WorkflowMax oversold its internal workflow system... It said it did a lot of functions where it didn’t really do [primarily revolved around the response rate of the WorkflowMax servers]. Also we had a significant connection speed [issue], as we can only get ADSL here. The data transfer was really slow... If you haven’t got a fibre connection or you’re handling a lot of data, the cloud’s not a good option. Some clients that have huge amounts of data transaction or not a good connection were also problematic [with cloud-based systems]”.

This also illustrates that even if cloud-based software has no initial cost, the cost of failed implementation can also be considerable:

“It was costly. We had to configure everything, put our ledgers in WorkflowMax. But in the end I drew a line and said, ‘that’s it, we’re purchasing a new server’ and undid everything we have done... One day we might have another look at it, but not for another 5 years.”

7.6 Provider Omicron

The interview was held with the accounts manager of a major provider of cloud-based practice management system. Prior to his position, the interviewee was the former owner of a cloud system provider in the accounting industry, and joined Omicron when his own business was merged.

The purpose of this interview is to gain contextual information on the market for cloud-based accounting software, and obtain an alternative viewpoint on the feasibility of cloud-based software for accountants.

	Client	Outsourcing
Benefits	Data consolidation Better service to clients	Cost (eliminates need for hardware upgrade) Lower maintenance Disaster recovery Security
Limitations/risks	<i>Privacy (SLA; client-side encryption)</i>	
Organisational	Outsourcing of bookkeeping function Flexible work of employees	Firm size
Environment		Vendor support

Table 7-8: Provider Omicron's remarks about cloud accounting

7.6.1 Cloud Computing for Client Service

A higher level of flexibility of accounting software was necessary, due to the pressures from offshore bookkeeping and requirements for remote working:

“Accountants are offshoring more and more of their bookkeeping work to Asia, where the transactions can be processed for cheaper, and there’s a lot of data transferring

back and forth between the accountant and the bookkeeper... In the meantime, the staff members are becoming more 'transy', as they demand more flexible working arrangements."

"The 'one-ledger' concept of cloud-based accounting software solves the problem. Accountants, bookkeepers and clients work on the same datafile, and any changes are updated instantaneously. Accountants are kept more up-to-date with what's happening in their clients' accounts... Cloud computing also eliminates the need to carry files everywhere, as everything's on the internet."

In terms of privacy of cloud-based data, the interviewee did not believe it to be a major issue, given that accountants are starting to outsource their data entry work anyway. However, Omicron does have measures in place to safeguard against data ownership issues:

"We sign service-level agreements (SLA) with our clients, and the agreement reiterates that that our customers retain the ownership of their data... Also we don't have access to our clients' actual data; they're all stored on our servers as encrypted [by the client side]."

7.6.2 Cloud Computing for Practice Management

The market for practice management system was previously dominated by MYOB. However, technological obsolescence led to opportunities for alternative offerings:

"MYOB Accountants' Office (AO) used to be the de-facto package for practice management, even though they didn't look after the accountants well... Then the programming language in which AO was written in became obsolete, which forced MYOB to up their games. The new version, called Accountants' Enterprise (AE), had significantly higher hardware requirements, because it's in a different language, and this forced accountants to upgrade their servers."

The gap of upgrading provided opportunities for emerging cloud-based practice management providers, who advertised lower support fees and upfront investment.

Likewise, the interviewee also observed that the Christchurch earthquake played a major role in promoting the popularity of cloud-based system.

“The Christchurch earthquake made many accountants [and business owners alike] realise that, if something happens to their office and they can’t get in anymore, it’s very hard for them to keep carrying on with their businesses. Cloud computing is like a remote backup [of their businesses’ information systems].”

In terms of the security of cloud system, the interviewee believes that clients’ data are, in fact, better protected in cloud-based systems:

“Cloud computing infrastructure is looked after by IT professionals, who have more expertise and resources over controlling for unauthorised access... You can expect most cloud providers’ servers to be very safe; otherwise they would be out of business”.

Chapter 8. Cross-case Findings

The two types of cloud computing systems are discussed in separate sections below. Table 8-1 shows the summary for factors relating to providing service to clients, and Table 8-2 shows summary for factors of using cloud as a means of outsourcing.

Based on the results, it is clear that all case study firms have adopted cloud-based accounting software in some form (Xero to be more precise). However, not all firms are utilising the cloud software to the same extent. For example, Firm B and D recognised cloud-based accounting software have strategic implications for their business; while the desire for adopting the software is weaker for firms C and E.

8.1 Summary: Cloud Computing for Client Service

Firm (Firm Size)	Adopted?	Benefits	Limitations/risks	Organisational	Environment
A (Small)	Yes (Xero, WorkflowMax)	Flexibility w/ services Easy to use (for clients) Communication with external parties Lack of commitment	Lack of Features	Owner's IT expertise Access to IT expertise Outsourcing of bookkeeping	Client pressure
B (Medium)	Yes (Xero)	Strategically beneficial Easy to use (for clients) Easy to maintain Flexible (clients) Security (internal control)	Lack of features Perceived data safety	IT expertise Firm size (large)	Competitive pressure
C (Small)	Partial (Xero)	Improvement in service quality	Privacy and security	<i>Lack of IT expertise</i>	None (insufficient client demand)
D (Medium)	Yes (Xero, MYOB)	Strategic benefit Data consolidation	Lack of features and customisation	Firm size (large)	Threat to business/competitive pressure <i>Clients' resistance towards cloud</i>

E (Large)	Yes (Xero)	Better service to clients Flexibility Data consolidation Ecosystem via add-ons		Firm size (large) Competitive pressure Perception from clients
F (Small)	Yes (Xero)	Flexibility (for clients) Reduced maintenance (for clients) Cost (for clients; no commitment) Easy to use (for clients) Data consolidation	Perception of Privacy	IT expertise (on premise) Client portfolio
Omicron (n/a)	n/a	Data consolidation Better service to clients	<i>Privacy (SLA; client-side encryption)</i>	Outsourcing of bookkeeping function Flexible work of employees

Table 8-1: Summarised findings for cloud as client service. Italic indicates a factor that inhibited adoption.

8.1.1 Perceived Benefits and Risks

In terms of perceived benefits, all firms have identified some form of benefits in adopting cloud-based accounting packages for their clients. Even though cloud-based software is initially targeted at clients, accountants nonetheless recognised the benefits that are realised when collaborating with their clients.

The flexibility of cloud technology provides significant potential for improving the operational efficiency and strategic effectiveness. Nearly all firms have found that cloud-based software had increased their communication efficiency with their clients. Effectively, cloud-based accounting software made it possible to maintain a single copy of a firm's accounting records that is accessible to multiple parties, and any changes are updated instantaneously. This is referred to by some as a "one ledger" system. Efficiency is increased as a result of the one ledger system, where auditors, bookkeepers and different users within the client business can access the accounting file simultaneously without issues involving merging changes.

Flexibility of cloud-based software also refers to the degree of integration between different software. The "ecosystem" of cloud software refers to the extent they can integrate seamlessly with other software. Cloud-based software takes advantage of application program interface (API) for seamless data transmission between different cloud-based services in real-time, which provides a higher level of integration than desktop-based software. In this case, Xero's ecosystem of a wide range of add-ons had been an important consideration for accounting firms to adopt Xero, as opposed to its competitors. In addition to Xero, firms A, B and E also adopted other add-ons that provided additional features to Xero, such as budgeting and reporting.

This improved strategic significance is coupled with the reduction of non-value adding services. Software like Xero is reported to be easier to use for clients, especially those that lack accounting knowledge. More explicitly, this allows clients to complete transactional bookkeeping work (like bank reconciliation) more easily, and be able to use features within the software without extensive knowledge in accounting. Providing clients with software that is easier to use increases the value of the accountant's services, by decreasing the amount of low-value work (such as data entry bookkeeping) accountants have to perform

prior to the more valuable advisory and consultancy work. Alternatively, the easy to use nature of the software also decreases the likelihood and severity of errors that are caused by the client due to unfamiliarity with the accounting concepts.

The combination of ease of use and flexibility provides significant potential for collaboration improvements on the accountant's end. Since accountants can obtain financial data from clients more easily, and with less low-value manual work, this permits accountants to provide valuable assistance to their clients from a higher level. For example, accountants can monitor their clients' financial health on a real-time basis, and alert their clients of any potential opportunities before they elapse and any risks before they grow into more significant threats. Alternatively, accountants have considerably more scope to "farm out" the low-value bookkeeping work to their clients, as the flexible nature of the software allows accountants to provide assistance on-demand, and only where assistance is necessary.

Cost was another important consideration, but it is an analogous concept to trialability. Because cloud-based software packages are charged on a subscription fee model, this relieves clients and accountants from making high initial investments. Also, accountants are free to experiment the cloud software in greater detail, as they are no longer held captive by any sunk costs of initial investment, or long-term service contracts. As a result, whenever accountants are involved with recommending new information systems and accounting systems for the client (as in the cases for Firm B, D, E and F), they would be more informed of the available alternatives, and propose solutions that better fits the client's needs. The lack of investment barrier also makes clients more receptive towards new software, as in the case of Firm F.

Despite the fact that cloud computing was initially viewed with scepticism due to the potential security and privacy issues, the respondents did not share the same concern. The interviewees believed that their interest of keeping the clients' data safe from unauthorised access is fundamentally aligned with the cloud provider's desire of maintaining a positive reputation for data security, which motivates the cloud providers to develop advanced security and encryption measures. Since cloud providers are more specialised in IT services

than accountants, they would be able to provide a higher standard of protection than if accountants stored the data on their own servers.

On the other hand, the issue of perceived privacy with cloud-based software is a more salient concern, in that an agency issue may arise when the cloud provider may profit from spying on or selling their clients' data, especially when cloud providers have full access over the storage facilities that housed the data. The perception problem is likely to diminish over time, as cloud-based services become more ubiquitous (such as online banking). The clients' doubts can also be mitigated partially through service-level agreements between the users and the cloud provider, and technical safeguards like client-level encryption (which theoretically eliminates the possibility for cloud providers to view clients' data). In some cases (such as Firm D), however, the clients' concern over the privacy of their data on the cloud had prevented accountants from providing cloud-based services to them. Likewise, the information on Firm C's website suggests that the firm did not actively promote cloud-based accounting software due to privacy and security concerns.

Currently, the biggest impediment to cloud adoption is the lack of features. Due to the fact that software-as-a-service is not intended for extensive modification by the user, accountants find it difficult to use it for more specialised purposes. For example, Xero does not yet provide customised reports and advanced consolidation functions. Nonetheless, the current state of cloud-based accounting software complements desktop-based systems rather than replacing them.

8.1.2 Organisational Factors

The results indicate that all firms offer cloud-based software for clients. The characteristics of the accounting firm are linked to their adoption of cloud-based software in terms of the organisation's IT expertise, either through the owner's expertise in IT or whether the accounting firm provides any IT-related services. Firms B and D provided IT consulting services, where they assess their clients' requirements and made recommendations based on their needs. The partner from Firm A had experience in IT projects, as well as the fact that they had close partnership with an IT consultancy firm. Firm F employed staff with IT background.

On the other hand, Firm C does not apparently offer any IT-related services. Incidentally, while the respondents of Firm C indicated that their firm did offer Xero, it does not promote it as much as the others. Also, while Firm E does provide IT consultancy services, the firm was too large, which meant that the business advisory department was somewhat more distant from IT consultancy. That being said, Firm E was quick to realise and capitalise the potential of cloud-based accounting software, despite being a relatively late entrant to the cloud accounting arena.

In terms of firm size, The results appear to be consistent with Mehrtens et al. (2001). The firm size does not appear to materially influence the extent of cloud adoption. For example, Firms B, D and E were noticeably larger than Firms A, B and F, yet Firm F had established partnership with cloud-based software vendors that were equivalent to the large firms. This finding was contrary to the ones from Oliveira et al. (2014). On the other hand, being the biggest firm out of the six cases, Firm E started offering cloud-based software at a much later time than its peers. While this appears to be consistent with the findings in Yazn et al. (2013), Firm B and Firm F adopted cloud computing around the similar time. In addition, Firm C uses cloud-based software in a more limited extent than all other firms. In light of this result, it is plausible that the relationship between firm size and adoption of a particular information system is shaped by a range of factors that affect large and small firms differently, and are specific to the information system in question.

8.1.3 External Environment

In terms of adopting cloud computing for clients, the anticipated pressure from clients and the competition were major sources of external pressure for most firms. Meeting clients' needs was a significant factor for Firm A, while Firm B feared the loss of clients as a result of not adopting cloud accounting. For Firm D, the adoption of cloud computing was motivated by the prospects of intensifying competition (and the loss of market and revenue as a result), while Firm E adopted cloud accounting in an effort to catch up with the smaller accountants.

In comparison, Firms C and F experienced somewhat lower competitive pressure, although for different reasons. Firm F have offered cloud-based software packages relatively early, and they are more focused in the construction sector, which allowed them to avoid the

competitive pressure. On the other hand, demand for cloud-based software from Firm C's clients is very low, which provided no urgency for Firm C to advertise cloud-based software on their website at all.

8.2 Summary: Cloud Computing for Practice Management

Firm (Firm Size)	Adopted?	Benefits	Limitations/risks	Organisational	Environment
A (Small)	Yes (cloud-based SaaS)	Flexibility (support business process)		Owner's IT expertise Access to IT expertise Prior IS arrangement Firm size	Vendor support Ecosystem (linkage w/ clients' products)
B (Medium)	No (in-house server)	None (no incremental features)	Lack of features	<i>Firm size (too large)</i>	None
C (Small)	Yes (cloud-based SaaS)	Disaster recovery Reduced maintenance Security Cost (no additional investment in IT infrastructure)	Dependency on internet access	Firm size	Vendor pressure (changing product offering)
D (Medium)	No (non-cloud)	<i>Cost</i> <i>Reduction of maintenance</i>		<i>Firm size (too large)</i> <i>Existing IT outsource</i>	None.

	outsourcing)	<i>Flexibility (remote access)</i> <i>Security/ Disaster recovery</i> <i>Physical location of cloud server</i>		<i>arrangement</i>	
E (Large)	No (IT via HQ)	n/a	n/a	<i>Firm size (too large)</i> <i>Organisational Structure</i>	<i>Other branches</i>
F (Small)	No (abandoned cloud-based SaaS)	Disaster recovery	Under-delivery of features (hype) Network access	Destruction of existing IT infrastructure Migration costs	Relationship with vendor
Omicron (n/a)		Cost (eliminates need for hardware upgrade) Lower maintenance Disaster recovery Security	Firm size	Vendor support	

Table 8-2: Summarised findings for cloud as practice manager. *Italic indicates a factor that inhibited adoption.*

8.2.1 Perceived Benefits and Risks

In terms of cloud-based systems, the Christchurch earthquake played a crucial role in supporting cloud computing, by raising the awareness for remote backup and disaster recovery. Otherwise, the reduction of cost and maintenance is an important factor for accounting firms to migrate practice management systems into the cloud. However, the quality of internet access represents a major obstacle to cloud-based practice management systems before it could warrant any proper attention from the firms.

The strongest motivation for migrating cloud is the Christchurch earthquake that occurred between 2010 and 2011. Firms C, D, F and Provider Omicron expressed that disaster recovery was an important consideration when a firm selects how its practice management system is to be hosted. As many Christchurch businesses were locked out of their office for extended period of time after the earthquake (hence, causing major disruptions to their business), disaster recovery and business continuation became a highly salient issue. For businesses that have limited IT expertise and resources, cloud computing provides a highly cost-effective method to achieve remote backup.

Aside from disaster recovery, the other factor for cloud-based practice management is the reduction in cost and maintenance. Because software is updated periodically, the user has to incur costs to obtain new software licenses and upgrade the server's hardware capacity. In addition, applying the software updates creates server downtime and disrupts the business' normal operation. These activities created additional administrative burden for Firm C. In comparison, cloud-based software simplifies this process significantly, as software updates are completed without the need for intervention on the end user's side, and are usually scheduled during non-business hours to minimise disruption. Cloud-based applications also relieve users from upgrading their hardware, as the hardware capacity is maintained by the cloud providers.

For the majority of the firms, flexibility was not found to be a major driver of adoption. The reason is that data in the practice management software are not usually shared with the clients, and generally require no rapid changes in computing resource. However, Firm A is a notable exception. Because Firm A outsources their bookkeeping process to a third party, this creates a need for data exchange between the bookkeepers and the accountants.

Similar to the “one ledger” system cloud for client service, adopting cloud-based practice management system improves inter-firm communication and collaboration.

In terms of risks, Firms C and F identified the network access to be a major issue. Since cloud computing relies solely on the internet for data transmission, the availability and the quality of network access is critical. The implication of losing internet access is particularly severe for cloud-based practice management systems, as the accounting firm is effectively immobilised without access to its practice manager. Firm C believed that adopting cloud computing invariably makes their firm more reliant on the telecommunication company to maintain the internet connection. Firm F’s experience was more negative, as the cloud-based practice management system did not have sufficient server capacity to handle the large volume of data transmission.

8.2.2 Organisational

It appears that smaller firms tend to be more interested in cloud-based practice management systems. However, cloud-based practice management systems face competition from a firm’s existing IT infrastructure, including any existing outsourcing arrangements. In the absence of strong perceived benefits, it is unlikely that cloud-based practice management systems would improve its position in the market.

Firms A, C and F were the only firms that had considered and adopted cloud-based practice management systems. This is consistent with Yazn et al. (2013), who suggested that micro firms are the most likely to adopt cloud computing due to their flexibility. However, the firm size effect is found to be driven by two factors. The first factor is that larger firms have more stringent requirements in terms of the complexity of the system. In this case, the firm size would not be a factor if the cloud-based product cannot cater to the firm’s needs in the first place. Firms B and D had clearly stated that cloud-based software was rejected because they lacked the features, customisability or sophistication that is appropriate for their needs. In addition, Firm F’s negative experience with network access and server load of cloud-based software suggests that cloud-based offerings are, in fact, inadequate for most but the smallest firms and/or non-mission critical processes.

The second factor relates to the presence of existing information systems. Firms are more likely to switch when their existing information system is not functional. In this case, however, it would appear that existing information system may be used as a benchmark, against which the perceived benefits and risks of a new system is evaluated based on. In the case of Firm F, because its existing server was lost during the earthquake, the benefits pertaining the lack of initial investment (low migration cost) and rapid deployment were particularly relevant to their situation. The interviewee for Firm F also confirmed that, had it was not for the earthquake, they would not have considered adopting cloud.

Conversely, the presence of a functional information system can be an obstacle to adopting cloud-based practice management system. This is particularly relevant to Firm D, who had outsourced its IT infrastructure to a local IT provider. The outsourcing arrangement provided nearly all of the benefits that a cloud-based practice manager usually offers, including minimal system and software maintenance, accessible remotely via the internet, and physical safety of the assets without an appreciable increase in cost. Moreover, outsourcing provided an additional benefit of knowing the physical location where data is stored. Also known as geo-restriction, the knowledge of data location provides greater certainty to the users regarding the physical security of the data, and eliminates any possible legal disputes relating to the jurisdiction of data (Yazn et al., 2013).

8.2.3 Environment

Software vendor is the dominating, if not the exclusive, source of external influence on cloud-based practice management system. The influence takes place as either pressure (as with Firm C) or incentive (as with Firms A and F).

In Firms A and F's case, the adoption of WorkflowMax was due to their relationship with Xero. WorkflowMax and Xero belonged in the same ecosystem, as the two were designed to integrate with each other seamlessly, and that Xero had considerable stake in WorkflowMax (Xero and WorkflowMax merged in 2013). Since both Firm A and Firm F had adopted Xero relatively early and had promoted it to their clients for a relatively long period of time, the accountants had developed a close working relationship with Xero. This additional layer of

relationship made it easier for the vendor to recommend WorkflowMax to the accountants, and to integrate it into their Xero-oriented business model.

On the other hand, Firm C's decision to adopt was primarily due to pressure from the software vendors. MYOB exerted its pressure by the vendor dropping support for the older versions of their product, which led to the necessity to replace the system. The lack of feasible desktop-based practice management system left Firm C with no choice but to adopt a cloud-based substitute. Because Firm C had retrospectively evaluated the benefits of cloud-based software and deemed it worthwhile, it is difficult to postulate whether the interviewees would have chosen cloud-based systems at all if a non-cloud option existed at the time of decision.

The firms clients and competitors did not exert any pressure over the adoption of cloud-based practice management system, due to the fact that such system is not usually visible to outsiders. However, Firm C mentioned that most of its local competitors have adopted cloud-based practice management systems within the last 12 months (2013-2014). It is possible that the adoption of cloud-based software also partially reflected Firm C's desire to act consistently with its peers, or the fact that others' actions provide a reassurance regarding the feasibility of cloud-based software.

Chapter 9. Discussion

The results indicated a strong distinction in the adoption pattern between cloud-based software for clients' use and for accounting firm's own use. While all of the six firms are offering some form of cloud-based accounting software to their clients, only two firms have implemented their practice management over the cloud.

Drawing on additional theoretical perspectives, this chapter evaluates the factors that led to the adoption of cloud computing by the accounting firms. The first section re-examines the roles that cloud computing play in the accounting industry. This is followed by a comparison of the ways that cloud-based software contribute (or failed to contribute) to the firms' core competencies against the relevant literature, through generating a competitive advantage or better efficiency. Finally, the fourth section discusses the likely implications of cloud computing for accountants in light of the recent popularity.

9.1 The Roles of Cloud Computing

Although "cloud computing" can mean either accounting software offered to clients or accountants' own practice management system, the two types of cloud-based systems are intended to serve in very different environments and purposes. Client-oriented cloud software is externally focused application that clients interact with directly, and acts as a key collaboration tool between the accountant and the client. Practice management systems, on the other hand, handle activities such as timesheets and job tracking. These activities relate to the internal process of an accounting firm, and are not visible to clients.

This difference is perhaps more clearly illustrated by the use of Porter's Value Chain Framework (Porter, 1985). For all case firms in this study, cloud-based accounting software like Xero are a part of the accountants' primary activity, since they improve the quality of the accountancy services provided to the clients. In comparison, the system of how accountants keep track of their clients, manage the staff and maintain IT infrastructure can be regarded as support activities, as practice management systems are designed to improve the internal efficiency of the accounting firm.

9.1.1 Interorganisational Nature of Cloud Computing

Cloud-based accounting software like Xero strongly resembles an interorganisational system. Since the Iacovou et al. (1995) model was originally developed to study EDI, which was a subset of interorganisational systems, the model explicitly takes into account the effects of the firm's trading partners has on a firm's decision to adopt, and the subsequent use of the system. While service firms like accountants do not necessarily have the level of supply chain complexity compared to manufacturers, it nevertheless provides an important perspective in evaluating why cloud-based software is as popular as they are, and what effect it would have on the accounting industry as a whole.

An interorganisational system is defined as "an automated information system shared by two or more companies... that facilitates the creation, storage, transformation and transmission of information" (Johnston & Vitale, 1988, p. 154). An interorganisational system is distinguished from conventional forms of information systems, in that information within the system is intended to be shared with one or more external organisations in the supply chain, and that such system provides benefits to all participants in the supply chain.

Based on the observations, cloud-based accounting software distributes benefits between the adopting accountant and its clients in a manner that is consistent with an interorganisational system. A key difference between this study and the previous studies on the adoption of cloud computing is that, while previous studies tend to focus on the benefits realised by the adopter firm, the reasoning of the interviewees in the current study for adopting cloud-based accounting software are client-driven. In other words, the cloud-based software are adopted primarily with the intention to provide greater benefits to the clients, even though factors like easier to use have little relevance to the accountants (Firm A). Similarly, communication and collaboration benefits both accountants and the clients, and was most frequently identified.

9.1.2 Practice Management Systems as ERP

The characteristics of an accountant's practice management system can be compared to that of an enterprise resource planning (ERP) system. ERP systems are designed to support all processes within a business by providing a comprehensive function set and organisation-

wide information sharing (Peng & Gala, 2014). Examining the most popular offerings of cloud-based practice management systems, it is evident that an accountant's practice management systems serve a very similar purpose as an ERP. By examining practice management system from the perspective of ERP systems, this study fulfils the call for industry-specific research into the merits of cloud-based ERP by Grubisic (2014).

The role of an enterprise resource planning (ERP) system is to establish information links between the various activities of a business (such as human resource, finance, manufacturing, client relationships and supply chain), such that decision makers have access to better and more complete information to make more informed decisions (Shukla, Agarwal, & Shukla, 2012). Likewise, for practice management systems, a similar set of comprehensive functions is provided. Based on the observations from Xero Practice Manager, CCH iFirm, MYOB Accountants' Office and APS Advance, the typical features that are provided in practice management system include: document management, job management, client management, timesheet management, staff management, and integration between clients' accounting files with the accountant's. The last aspect had already been discussed in the previous section as interorganisational systems.

As existing literature had highlighted the potential for very high synergy between ERP systems and cloud computing, cloud-based practice management systems have potential to improve an accounting firm's operation. The delivery ERP system via cloud represents the best of both worlds: businesses can exploit the benefits of an ERP system without the burden of investment and cost. While traditional ERP systems (maintained in-house by the business users) provided very clear benefits in terms of reduced costs, increased revenue opportunities and efficiency improvements (Shukla et al., 2012), the cost of acquiring, implementing and maintaining such system is burdensome to large businesses, and prohibitive to smaller ones (Grubisic, 2014). Cloud computing, on the other hand, allows businesses to use IT resources in a much more flexible manner, with minimal initial investment, and pay for only what they use (Armbrust et al., 2010).

9.2 Competitive advantage of Cloud Software

Competitive advantage refers to the situation when a firm “[implements] a value creating strategy [that is] not simultaneously being implemented by any current or potential competitors” (Barney, 1991, p. 102). The IS literature had recognised that adopting and using information systems may create significant benefits to the adopter business, such as efficiency improvements, strengthening of bargaining power or product differentiation (Bakos & Treacy, 1986; Clemons, 1986; Zhang & Lado, 2001). However, these benefits often do not translate into competitive advantages, and it is even debatable whether information system creates any competitive advantage at all (Clemons, 1986; Mata, Fuerst, & Barney, 1995; Zhang & Lado, 2001).

Resource based view is a useful theory to understand how information systems create competitive advantage, as it is commonly regarded as one of the most powerful theories in explaining organisational relationships (Barney, Ketchen, & Wright, 2011). The resource based view presumes that a business is a collection of resources, and the resources can create competitive disadvantage, competitive parity, temporary competitive advantage or sustained competitive advantage for the business. Sustained competitive advantage is regarded as the most advantageous position for a firm, where it possesses resources that are valuable, rare, inimitable and strategically non-substitutable (Barney, 1991; Mata et al., 1995).

This section attempts to explore how cloud-based accounting software offered to clients provides competitive advantages for accounting firms, and how such competitive advantage may drive adoption.

9.2.1 Value

Value is a necessary but insufficient condition for creating competitive advantage. A resource is deemed valuable when it is capable of improving the business’ operational efficiency, reduce cost or differentiate products (Bakos & Treacy, 1986; Mata et al., 1995).

Adoption of cloud-based accounting software for clients’ use provides clear benefits in terms of efficiency. Clients’ accounting transactions can be viewed as raw materials for

accountants, as the higher-level advisory and consultancy services critically depend on the availability and quality of accounting data. Adopting such cloud-based software allows accountants to “export” the work of bookkeeping and data-entry to their clients, as the software is easy enough for the latter to perform their own bookkeeping with very little assistance from accountants (Johnston & Vitale, 1988). This, in turn reduces the cost for accountants to acquire their clients’ financial records, and can potentially offer reduced fees for clients, and less time spent on these low-value activities.

In addition, the adoption of cloud-based software also provides efficiency improvements to the accountants themselves. As the cloud-based system is designed to provide a single data storage that can be accessed on a real-time basis by multiple parties, accountants are provided with better data to analyse their clients’ financial performance, and improved response to clients’ specific needs. This is corroborated by the interviewees, who had identified the benefits in terms of faster end-of-year accounts preparation and being able to check the accuracy of their clients’ accounting entries more easily.

Similarly, cloud-based accounting software offers some degree of product differentiation, which gives accountants significant scope to add value in their client-accountant relationship. While cloud-based systems are initially perceived as terminators of accounting, all respondents in this study recognised that software like Xero are powerful tools to improve the quality and scope of their service. Cloud-based accounting software allows accountants to monitor the clients’ financial health and identify risks much earlier. Accountants can also utilise the vast array of Xero addons that are available, potentially providing more features for the client and further improving the accountant’s own efficiency by substituting business processes and tools with addons. Accountants can also use their knowledge of clients’ financial status to recommend and provide services that better meet the clients’ needs at any given time.

In summary, based on the results, cloud-based accounting software that are adopted for clients’ use produces clear benefits for the accountant in terms of improved efficiency through interorganisational communication and improved service quality (like real-time reporting).

9.2.2 Rarity

In order for any competitive advantage to arise, a firm's valuable resource must be heterogeneous. If the resource is available to the firm's competitors, everyone would utilise the resource in the same manner and derive the same level of benefit, which negates any advantage the business may have against its peers (Barney, 1991; Mata et al., 1995). A resource becomes rare when not all competitors in the industry have equal access to it.

The extent of resource heterogeneity for cloud-based accounting software appears to be very limited. Cloud-based software is developed and marketed by an independent third party (such as Xero), which means that all accounting firms have equal access to the software, and any accounting firm can choose to offer software like Xero to its clients. Moreover, since cloud computing is designed to require low initial investment and maintenance compared to traditional systems, the barriers of financial resource and specialised knowledge is virtually non-existent. This is illustrated by Firm E's experience, who was able to adopt Xero three years after its competitors, and not substantially disadvantaged in terms of access or benefits.

Hence, according to the resource based view, cloud-based accounting software for clients is a competitive parity, which explains the near-ubiquitous adoption rates of cloud-based accounting software. Due to the fact that the resource (cloud-based accounting system) can be adopted and utilised by all firms in the same manner, all firms are able to improve their efficiency and effectiveness in the same manner and to the same extent (Barney, 1991). In other words, accountants would not obtain any advantage over its competitors by adopting cloud-based accounting software; but not adopting the cloud would result in a disadvantage compared to its peers. As a result, it would be in every accounting firm's best interest to offer cloud-based accounting software, as it increases the firm's chance of economic survival (Porter, 1980, as cited in Barney, 1991).

Once the adoption of cloud-based accounting software reaches critical mass, the remaining non-adopters would face institutional pressure. Actions undertaken by other organisations creates institutional pressure for the firm to conform, especially during periods of uncertainty (Ang & Cummings, 1997; Loh & Venkatraman, 1992). In the context of cloud computing, the benefits derived by early adopters would likely to motivate other accounting

firms to follow suit. Alternatively, the promotion of cloud-based accounting software by the accounting firm may contribute positively to the firm's image, where the availability of cloud computing may be perceived by clients as state-of-art (Johnston & Vitale, 1988). For example, Mehrkens et al. (2001) noted that the effects of firm image perceived by customers towards the firm's intention to adopt the internet was substantial.

9.2.3 The Earthquake Effect

The Christchurch earthquake is an important intervening factor, as it alters the economic structure considerably. The Christchurch rebuild had significantly increased the demand for construction-related activities, which saw an increase of both the number and the size of construction firms and contractors. This would inevitably leads to these construction firms comprising a larger proportion of the accountants' total clients. As Firm F asserts, the construction sector is particularly suited to cloud-based software, due to the fact that construction work are field-based (hence, data mobility becoming a major concern), and that most construction clients lack IT or accounting knowledge (which makes Xero's ease of use and low maintenance particularly valuable). As a result, in order for the accountants to capture these new and expanded businesses, there is strong motivation for them to adopt cloud-based accounting software.

9.3 Implications of cloud "paradigm" for Accountants

Critics such as Fulford (1999) expressed disdain towards the word "paradigm", for the word is generally used to grossly overstate the importance or misstate the nature of a phenomenon. Yet, cloud computing had been described by countless authors as a paradigm-shifting innovation (Grubisic, 2014; Gupta et al., 2013; Low et al., 2011; Marston et al., 2011; PwC, 2011). The question of whether cloud computing really has a profound impact on the businesses that warrants the label of "paradigm-shifting" varies considerably between industries (Grubisic, 2014). This study shows that, for the accounting industry, cloud computing has a very strong potential to become a paradigm-shifting innovation.

While some accountants may perceive cloud-based accounting software to be a threat, accounting software is really redefining the core competencies of an accounting firm. The main activities of accounting firms typically consist of a mixture of transactional accounting (bookkeeping), compliance-related tasks (financial and tax reporting) and advisory activities (tax advice, business development). The status quo of accountancy services before cloud computing (the old paradigm), as described by Firm D, is one where accountants typically spend a substantial portion of their time and effort on the compliance activities.

Where cloud computing does shatter the paradigm is the rapid de-emphasis (and to a certain extent, trivialise) the transactional aspect. Under the new accounting “paradigm”, the bookkeeping is almost entirely performed by the business clients themselves. To this end, the characteristics of cloud computing greatly assist the accountants in providing their specialised knowledge. The collaboration benefits as a result of one-ledger system allow accountants to gain access to their clients’ latest financial data, and to provide much more timely and relevant advice. The ease of use and access allows accountants to design IT workflow that are of much better fit with the clients’ requirements; an example is the highly mobile nature of construction businesses. Not having to prepare the accounts for their clients also reduces the accountants’ workload, allowing them to complete their services much more quickly.

Although cloud-based accounting would virtually eliminate transactional accounting entirely, which comprised a considerable portion of an accountant’s service line or revenue, an accountant cannot realistically expect to thrive on handling accounting transactions alone. As discussed before, competitive advantage arises only when the firm’s resource is non-imitable; and resources that are imitable can only amount to a competitive parity (Mata et al., 1995). Transactional accounting work is not a “competitive advantage”, due to the fact that knowledge and skills in bookkeeping and preparing reports can be acquired by (quite literally) anyone, such as high school and university students (Krell, 2011). The emergence of accounting software (cloud-based or otherwise) makes no change whatsoever to the competitive parity nature of the work, except that accountants now face an additional source of competitive pressure: the new cloud-based accounting software is so easy to use that non-accounting professionals previously with simple bookkeeping needs can potentially bypass the accountant, and use software like Xero directly.

What cloud computing does, instead, is highlighting the accountants' true competitive advantage by raising the competitive parity. The value of accountancy work lies in the ability for the accountants to translate theories and principles into outcomes and results, which is a unique resource. For example, professional judgement is a crucial skill for accountants and auditors, but "good" professional judgement that is free from bias or misunderstanding can only be developed through a combination of talent, experience, learning and conscious reflection (KPMG LLP, 2013). Suffice to say, advisory-based services require skills that cannot be taught easily (such as professional judgement), and the level of mastery varies enormously between individuals with different levels of experience, specialised skills, aptitudes and accountant-client relationships.

In summary, cloud-based accounting software does not put an end to accounting; it reshapes what accounting is. Cloud-based software like Xero should not "steal" work from accountants, as it merely automates an activity that is already highly structured, easily obtainable, and of little strategic value to accountants. It does, however, place substantial pressure for accountants to develop on their own core competency beyond recording accounts and preparing reports. Cloud computing rewards accountants with innovative ways to work with their clients, while at the same time punishes those that resist this trend by reduced fees and business opportunities.

9.4 Cloud-based ERP for accountants

In spite of the synergy between cloud computing and ERP system described earlier, cloud-based practice management systems remains a hard sell. More importantly, the decisions and outcomes of adopting a cloud-based practice management system vary considerably between the case firms. This section attempts to explore the state of cloud-based practice management systems by drawing on some cloud-based ERP research, and identify the missing link between the theory and practice.

In terms of cloud-based practice management systems, the relevant questions are:

- What are the differences between adopters and non-adopters of cloud-based practice management system?

- What do the results indicate regarding the feasibility of cloud-based practice management system?

9.4.1 Adopters

Ready adopters are characterised by high levels of perceived benefits, organisational readiness and environmental pressure. In this study, Firms A and C had benefited from the reduction of resources spent on maintaining their software and gains in flexibility. The cloud systems allowed them to free up their resources in order to invest in more productive areas at the same time (Benlian & Hess, 2011), which was crucial given their shortage of resources.

External influence was the other prominent factor that led to the adoption of cloud-based practice management system. Firm C had experienced arguably the strongest pressure, since it was somewhat coerced into adopting the cloud system as a result of lack of viable non-cloud alternatives, and the loss of existing practice management system due to vendor dropping support for that system. On the other hand, the influence of Firm A was somewhat more positive, as the decision to adopt arose from the firm's expertise gained from providing Xero and WorkflowMax to their clients, and the close relationship with the vendor as a result.

In the organisational readiness department, the two firms were the smallest in the cases studied. This resulted in a relatively simple management structure, which allowed them to make decisions and implement the new more quickly than their larger counterparts.

In summary, while the synergy between cloud computing and ERP systems are not universally applicable, the anecdotal evidence provided by Firms A and C does indicate that there is potential for practice management systems to become cloud-based.

9.4.2 Non-Adopter: Reasons for Non-Adoption

This section explains why the success factors did not apply to Firms B, D and F. Firm E is excluded from this discussion, as it is unable to adopt cloud-based practice management system due to circumstances outside its control. In this study, the non-adopting firms are

larger in size, motivated by a different set of benefits and have relatively more opportunities due to the fact that they possess relatively more resources.

Firms B and D rejected cloud-based practice management systems as a viable option, since they perceived cloud-based alternatives were too simplistic in terms of features and customisability for their needs. Firm B could not adopt the cloud-based alternative, due to the need for more complex functions to service certain clients (such as consolidation of overseas subsidiaries). Firm D, on the other hand, saw a fundamental mismatch in terms of the features, customisation and robustness that the cloud-based systems offer, versus the level that is deemed appropriate by the firm. Similarly, the cloud service provider's server infrastructure and the internet could not handle the volume of data transmission for Firm F, which further suggests that the existing cloud solutions are not explicitly designed to withstand the access requirements of medium to large firms. The perceived simplicity may, in fact, be due to the fact that the cloud service providers are intentionally focusing on capturing the smaller accounting firms.

A likely explanation for the lack of cloud-based solutions for the large firms is the competitive pressure from traditional outsourcing. Traditional outsourcing and cloud-based outsourcing are extremely similar, save for one technical detail. Cloud-based outsourcing relies on the "cloud" of servers across the world, while traditional IT outsourcing providers keep their servers on premise. The only differences are that cloud-based outsourcing can mobilise much more computing resources to its users at any given time, therefore allowing for large fluctuations in resource usage pattern; as well as allowing businesses to deploy their IT infrastructure rapidly through the use of SaaS and PaaS (Armbrust et al., 2010; Marston et al., 2011).

The newly established cloud-based systems must compete fiercely with the more established traditional outsourcing solutions in an area where seasonality or volatile resource usage does not appear to be a major concern to the users (indicated by the lack of mentioning by accountants). Effectively, traditional outsourcing acts as a "best of both worlds" approach that allows large firms to enjoy the same benefits as small firms with cloud-based alternatives would. In this study, Firm D outsourced its practice management server system to a local IT provider. The benefits of the outsourcing arrangement derived by

Firm D were very similar to those of the adopters of cloud-based practice management system, including relief from the effort and expense of maintaining an in-house IT system, competitive flat-rate cost for server space rental, and additional safeguards against disasters. Moreover, traditional outsourcing provides reassurance over the geo-political location in which the data was stored, which potentially avoids jurisdiction disputes (Yazn et al., 2013).

Much of the growth of cloud-based practice management systems can be attributed to the Christchurch earthquake, which gave rise to the need for businesses to safeguard their IT systems against natural disasters. As Firm F attests, the interest in cloud-based software had risen significantly immediately following the earthquake, due to fact that the earthquake rendered most businesses in the central city unable to access their business data, and created substantial interruption to their business for up to months. In comparison, cloud computing provides an easy solution, as cloud service provider can provide data protection and disaster recovery functions reliably and at a much lower cost than if the information system is managed internally (Kynetix Technology Group, 2009). Alternatively, the ability to deploy rapidly with minimal initial investment is also attractive to the businesses that are seeking to re-establish their IT systems.

Firm F is the one such example: a main motivator for adopting cloud-based practice management system was due to the fact that the existing server was lost to the earthquake. For those firms that have lost their IT infrastructure to the earthquake, the decision to adopt cloud computing becomes a “green field adoption” one as opposed to a replacement one (Benlian & Hess, 2011). The lower investment and cost of cloud-based systems compared to traditional systems are especially appealing to “green field” businesses, due to their immediate need for IT systems. Also, since they tend to relocate frequently between temporary office locations, having their information system that is not tethered to a server makes it easier and less expensive to move between premises and keeping the business process running. The notion of green field adoption also applies to Firm C, as their existing IT system is facing technical obsolescence.

Chapter 10. Conclusion

Using a multiple case study design, this study has provided an exploratory perspective of the role of cloud computing in the accounting industry. This study has defined cloud computing in terms of the functions of the IT configuration. The results show that the notion of cloud computing actually consists of two types of configurations that are used for different purpose, and the two types vary drastically in terms of extent of adoption.

This chapter concludes the study by referring back to the research questions that were posed in the beginning of the research, followed by the contributions to the literature. The implications of this research to practice are discussed, as well as the potential limitations. Finally, the future directions for research are outlined.

10.1 Research Question Revisited

RQ1: what role does cloud computing play in the professional accounting services industry, and in which ways do they differ from each other?

For professional accounting firms, cloud computing is applied to the firms' information system in two ways. As a piece of accounting software, cloud computing facilitates interorganisational communication between the accountant and the client, which reinforces the relationship between them. Alternatively, as an ERP system, cloud computing provides an inexpensive yet disaster-resilient solution for accounting firm's practice management. However, there is a remarkable difference between the two cloud implementations in terms of the accounting firms' willingness to adopt them.

The adoption of cloud based accounting software by accounting firms is almost universal, due to the substantial potential in supporting the firms' primary operations. As an information-based industry, accountants rely on complete, accurate and timely information from their clients in order to provide the appropriate advisory services to them. Cloud-based accounting applications streamline the process of acquiring information. Because the cloud-based accounting applications are easier to use, clients can maintain their own accounting records on an ongoing basis. Also, the flexibility of access allows accountants to access the most recent accounting data with minimal effort and delay. The resulting benefit is mutual.

Accountants are able to thrive by providing services to their clients that are more relevant, and clients benefit from better the information and advices from their accountants regarding their growth strategy.

On the other hand, cloud-based practice management systems, which are an adaptation of cloud-based ERP systems tailored to accountants, are still struggling to establish their market presence. The current offerings of cloud-based practice management systems are focused on the small accounting firm demographics, and are lagging behind in terms of robustness and features compared to their desktop-based counterparts. However, cloud-based ERP systems are far from being mature. This study supports the view that cloud computing can, in fact, add significant value and market share to the practice management systems, and ERP systems in general.

RQ2: Why do accounting firms choose to adopt cloud-based software solutions for their business, and for their clients? What are the factors that motivated or discouraged the adoption of “cloud computing”?

Accountants adopt cloud-based accounting software applications because they are easier to use by non-accounting professionals (i.e. their clients), and they drastically reduce time and effort required for accountants to obtain their clients' financial data. As a result, cloud computing provides a more efficient and effective method of collaboration between accountants and their clients. It is worth noting that the perceived benefit of the software is of an interorganisational nature. In many cases, accountants adopt cloud-based accounting software because it provides benefits to their clients.

Alternatively, from the strategic management perspective, cloud-based accounting software represents a competitive parity. In other words, cloud-based accounting software is a necessity to maintain competitiveness with its competitors, which creates a greater urgency for non-adopters to catch up. This creates a strong competitive pressure for accountants to adopt the software, as the non-adopters would be disadvantaged. The accountants' image and perceived technical expertise may also be affected by adopting cloud software, due to the fact that software like Xero may be considered standard.

Accounting firms that possess a higher level of IT expertise via its employees and partners are likely to adopt cloud-based accounting software earlier and explore the features more thoroughly than those that do not. Active championing by the partner is particularly important in accelerating the adoption of cloud-based accounting software, and this is not necessarily linked with firm size.

On the other hand, in terms of practice management systems, the cloud-based alternatives provide little value to an accounting firm, with perhaps the exception of cost. Small accounting firms may find cloud-based solutions to be an adequate solution, due to the fact that cloud-based solutions requires less financial and human resource to implement and maintain. However, the lack of features and limitations in capacity is a critical drawback for larger firms.

*RQ3: What are the perceptions of accountants towards the cloud computing paradigm?
What are the likely implications of cloud computing on accountants?*

The cloud-based accounting software applications have immense potential to automate and export work that is related to transactional bookkeeping. This may alter the business model of accounting firms drastically. Cloud-based applications like Xero make it much easier for the non-accounting professionals to maintain their own accounting records efficiently and autonomously. As a result, these applications would cannibalise the demand for bookkeeping, and possibly eliminate a considerable portion of work for accountants. As a result, accountants would be forced to develop their core competency or competitive advantage in order to compensate for the lost income sources.

From an industry-wide perspective, cloud-based accounting software does not necessarily change the industry itself. Transactional accounting is not an accountant's core competency or competitive advantage, which means that services such as advisory, auditing and compliance consulting are unaffected by the cloud. However, as more accountants seek to improve their non-transactional services, the accounting industry is expected to be much more competitive.

10.2 Contributions to Literature

This study had identified an issue in the prior cloud computing adoption literature, in that the concept of “cloud computing” is not fully explored. This issue arises from (i) the ambiguity and the flexibility of cloud computing “paradigm” itself, and (ii) the fact that business environments generally vary significantly among different industries. This study contributes to the literature in three important ways: an industry-specific empirical investigation into the cloud computing adoption; a definition of cloud computing in terms of its purported use; and an attempt to synthesise IS adoption literature with the strategic implications of information systems.

By focusing on the accounting industry only, this study provides a clearer picture regarding the present state of cloud computing, and the underlying reason behind its apparent popularity. As a service industry, the accounting industry does not have a substantial supply chain, and accountancy-based services are highly homogeneous. The single-industry research scope also acts as a control, where every case firm offers a similar set of products, structures their businesses in a similar way, competes in a similar way, and is susceptible to same industry pressure in similar ways. It is this scope that allowed the study to find that the rationale for accountants to adopt cloud computing differs considerably from the other industries.

Furthermore, this study grounds the concept of cloud computing in terms of tangible, concrete information systems that leverage the characteristics of “cloud” to contribute to the firm. More specifically, by utilising the definitions from Clemons (1986), this study had differentiated between the two basic types of cloud-based information systems: cloud-based software that is primarily used for the client’s benefit, and the ones that are used to support the accountants’ operational efficiency. Due to the differences in the roles of cloud-enabled information systems, the cost and flexibility benefits afforded by cloud computing have very different impacts on the effectiveness of the cloud-enabled systems, and the adoption of the cloud-based software vary significantly as a result.

Finally, this study incorporates the strategic management theories to further investigate the wider, industry-level implications of cloud-based software for the accountants. Most of the previous studies have used the TOE framework, and one of the criticisms with that

framework is that it constrains the perspective on the adopting firm and its immediate surroundings. Combining Iacovou's EDI adoption framework with the resource-based view views the accounting firm in relation to its clients and competitors, and the strategic significance of cloud computing is emphasised.

10.3 Implications to Practice

From an accounting practitioner's perspective, the cloud computing phenomenon represents a rapid shift in the role and the business model of accountants. It is critical for an accounting firm to have expertise with cloud-based accounting software, as the cloud-based software provides significant boosts to the efficiency and effectiveness of an accountant's services. Accountants that neglect cloud-based software may find it difficult to compete against the adopters of the cloud.

In addition, the presence of cloud-based accounting software pushes accountants away from the role of report preparers and bookkeepers, and towards the role of problem solvers and early warning for their clients. The transition may be turbulent, and a skill gap may emerge. Since the problem solving services are highly tailored to the clients and their operating environments, accountants are required to possess a far broader skill set in terms of problem solving skills and flexibility in learning abilities in order to be able to resolve a large variety of problems.

In short, accountants in the cloud computing era need to justify the purpose of accounting for an organisation, and how accountancy services contribute to the wellbeing of that organisation. Although it is difficult to speculate the future outlook for accountants, cloud computing is a reminder that bookkeeping is only a small proportion of accounting.

10.4 Limitations of Study

It is important to note, however, that all research designs and methods involve trade-offs between the breadth and volume of data, and the details that can be extracted from each case. The limitations associated with the methods chosen for this study should be taken into account when interpreting the findings of this study.

This study is context specific, in that the research subjects are mostly from Christchurch, and this study examined professional accounting firms only. While the generalizability of this study may be limited, the results can be nevertheless be applied to other professional firms (such as lawyers and medical practices) and service firms that rely on a high level of client-business interaction (such as design, media, IT and advertising firms). However, care should be taken when generalising the results of this study across to other industries, as the factors for those industries may vary. Examples of such factors include: types of cloud-based software, presence of regulations, business environment (SWOT within the industry) and nature of work.

Another potential limitation is the unique business environment surrounding Christchurch. The Christchurch earthquake saw a decline of business activity across all industries, except for the construction-based businesses that grew due to the rebuild. As a result, the composition of business in Christchurch is heavily skewed towards construction-related activities compared to other cities and geographical regions in New Zealand (and to a certain extent, rest of the world).

Finally, the interview method that was selected for data collection may also give rise to some limitations. The interview process is inherently subjective due to the fact that people's memories are imperfect and incomplete. The lack of rigid structure of a semi-structured interview may lead to the researcher misinterpreting the responses based on his/her preconceived ideas. However, the incompleteness of people's memory provides an important source of information. The interviewees would most likely to remember the factors that were perceived as more important, and this provides insights into the relative weightings of the factors to adopt cloud computing. Moreover, measures are undertaken to mitigate the subjectivity in interpretation, including: voice recording the interview whenever possible (and with the permission of the interviewee) for transcription, and providing interviewees with the interview summary to identify any material deviations from their intended meanings.

10.5 Future Research Directions

Being an under-researched area, this research had uncovered many opportunities of integration between cloud adoption and the relevant IS theories. In light of the findings, the future opportunities for research are discussed below:

- i) Future research can further establish, identify and differentiate between the various roles of cloud computing. The concepts of internally- and externally-focused applications are antiquated, since the paper authored by Clemons (1986) was published in 1986. Significant developments in both technology (such as internet and social media) and management theory (Resource Based View) had taken place since the paper was published.
- ii) Future research can interpret the adoption of cloud computing in terms of the relevant theories pertaining to a firm's value creation and strategy. Iacovou et al. (1995) would be a suitable starting point, as the notion of perceived benefit can be extended to incorporate inter-organisational benefits and competitive advantages. Similarly, outsourcing theories can be used to examine firms' reasons for favouring (or rejecting) cloud-based solutions for internal use.
- iii) As Grubisic (2014) had noted, studies of cloud computing adoption should be industry-specific. Future research can examine the extent of cloud computing adoption in other industries, and compare them against the accounting industry. The comparison between the accounting industry and another one (such as advertising or construction) would provide important insights into the factors that motivated the growth of cloud computing.
- iv) The contextual limitations identified in this study can be tested by conducting similar studies in other cities or countries. Despite the unique business environment in post-earthquake Christchurch, the growth of cloud-based accounting software like Xero is not constrained in New Zealand. Studies in other regions would reinforce the state of cloud computing for accountants.
- v) Future research can consider adopting a mixed methods approach, where the details of a qualitative study would be complemented by the breadth of data provided by quantitative methods.

- vi) Alternatively, future studies can take a more qualitative and detailed approach by examining the dynamics between the cloud provider, the accountant and the accountant's clients.

Appendix 1: Interview Questions and Schedule

1. Basic firm information:

- a. How big is your firm, in terms of employees?
- b. What service lines does your firm provide, and what departments do you have?
- c. What is your role in this organisation?
- d. What is your level of IT proficiency?
- e. What is your understanding of the “cloud computing” phenomenon?

2. Externally Focused Cloud Computing: Adoption

- a. What cloud-based software do you offer to your clients?
- b. When did you start adopting the said cloud-based packages?
- c. Why did your firm chose to adopt cloud computing? What would be the most important reasons for your firm to adopt cloud?
- d. Does the firm offer any non-cloud accounting software? What are they? How much emphasis do you place between cloud and non-cloud software?
- e. Evaluation:
 - i. What are the benefits as a result of adopting cloud-based accounting software?
 - ii. Were there any unexpected risks or surprises?
 - iii. With the benefit of hindsight, would you choose cloud-based software again?

3. Internally Focused Cloud Computing:

- a. What software do you use for practice management?
- b. IF USING CLOUD:
 - i. When did you make the switch to cloud-based practice management systems?
 - ii. What systems had you been using prior to migrating to the cloud?

iii. Why did you choose to adopt cloud?

What other alternatives have you considered?

c. IF NOT USING CLOUD:

i. Do you have any intentions to migrate to the cloud?

ii. Why/why not?

iii. What changes would it be necessary for your firm to adopt cloud-based practice management?

d. Evaluation:

i. What benefits have you gained from moving your practice management systems into the cloud?

ii. Have you encountered any unexpected risks or surprises?

iii. With the benefit of hindsight, would you choose cloud-based practice management systems again?

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